URS

COMPLIANCE TEST REPORT:
MAIN STACK
GATEWAY ENERGY &
COKE COMPANY

Test Date: May 30, 2012

Revision 1.0 (7/19/12)

CERTIFICATION SHEET

Having reviewed the test program described in this report, I hereby certify the data, information, and results in this report to be accurate and true according to the methods and procedures used.

Data collected under the supervision of others is included in this report and is presumed to have been gathered in accordance with recognized standards.

This report has received a second-tier review and corrections made as described in the Revision Documentation page contained within this report.

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Compliance Test Report: Main Stack

Gateway Energy & Coke Company

Facility ID: 119040ATN

Test Date:
May 30, 2012

Prepared for:
Gateway Energy & Coke Company
Granite City, Illinois

Prepared by:
URS Corporation
Oak Ridge, Tennessee

Revision 1.1

COMPLIANCE TEST REPORT:
MAIN STACK

GATEWAY ENERGY &
COKE COMPANY

FACILITY ID: 119040ATN

Prepared for:

Gateway Energy & Coke Company
2585 Edwardsville Road
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Revision 1.1

Test Date:
May 30, 2012

REVISION DOCUMENTATION

Revision 1.0 – Performed by URS on 7/19/12

The revision of this test report includes revised mass emission rates for CPM, $PM_{10}$and $PM_{2.5}$. The cause for the revision is based on the original Excel spreadsheet used to calculate the mass emission rates. The cells within the Summary of Results in the spreadsheet used to report the concentration and mass emission rate of CPM were not populated with the correct number produced by the spreadsheet calculations. Because the CPM is added to both the PM_{10} and $PM_{2.5}$, the reported results for these parameters were incorrectly reported as well. The issue was resolved by correcting the input to the CPM cells within the Summary of Results.

Affected pages include:

- Table 1-1, page 1-2
- Table 2-1, page 2-1
- Appendix B, EPA Method 201/202 Summary of Results

None of the required revisions cause the source to be out of compliance with current operating permit requirements.

Revision 1.1 – Performed by URS on 10/3/12

The first revision of this test report includes revised mass emission rates for NO_x and CO. The cause for the revision is due to the CEM operator including part of the final bias check calibration data in the average concentration for test run 3. When the incorrect data was removed from the average, it yielded a higher overall concentration for NO_x and a slightly lower overall concentration for CO.

Affected pages include:

- Table 1-1, page 1-2
- Table 2-1, page 2-1

The second revision of this test report includes revised concentrations used in the CEM bias check at the conclusion of test run 3, which is provided in Appendix C. The CEM operator did not confirm that the value from the run 2 post check was carried forward to the initial Run 3 initial check. The value in the spreadsheet showed an incorrect bias for all the CEMs. This error did not impact any test results, but is being corrected to provide accurate data for the CEM testing.

Another revision of Appendix C includes correcting a typo made by the CEM operator on the CEM's Compliance Data. The header for O_2 and CO_2 were reversed on the original report. This error did not impact any test results because the correct O_2 and CO_2 concentrations were used in the actual emission rate calculations.

Affected pages include the entire Appendix C has been replaced to include the corrected data and include additional CEM raw data.

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ACRONYMS

API	Advanced Pollution Instrumentation
CEM	Continuous Emission Monitor
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CPM	Condensable Particulate Matter
dscf	dry standard cubic feet
EPA	Environmental Protection Agency
GECC	Gateway Energy & Coke Company
HNO_3	Nitric Acid
IEPA	Illinois Environmental Protection Agency
NO_x	Nitrogen Oxide
O_2	Oxygen
PM	Particulate Matter
PM_{10}	Particulate Matter less than 10 microns in diameter
$PM_{2.5}$	Particulate Matter less than 2.5 microns in diameter
ppmv	parts per million by volume
QA	Quality Assurance
QC	Quality Control
SO_2	Sulfur Dioxide
VOM	Volatile Organic Matter

1. INTRODUCTION

URS Corporation (URS) performed a series of emission tests at Gateway Energy & Coke Company (GECC) on May 30, 2012, to demonstrate continued compliance for the main baghouse stack. The tests were performed using the methods and procedures listed in the Construction Permit (119040ATN, October 23, 2009) and as described in the Intent to Test Notification submitted to the Illinois Environmental Protection Agency (IEPA) dated April 23, 2012.

Personnel on-site during the tests included:

- Justin Prien, Environmental Manager, GECC;
- Kevin Mattison, IEPA; and
- Michael Mowery, Source Sampling Manager, URS Corporation.

This report summarizes the test results for the Main Stack in Section 2 and lists the test methods in Section 3. Section 4 provides information regarding the project quality assurance (QA)/quality control (QC) procedures. The appendices contain process data (Appendix A), field and analytical data and calculations (Appendices B and C), URS calibration information (Appendix D), and a copy of the Intent to Test Notification provided to IEPA.

1.1 Process Description

There are 120 ovens at GECC that operate on a 48-hour coking cycle. The operating schedule is arranged such that half the ovens are charged each day. For example, the 60 even-numbered ovens are charged one day and the 60 odd-numbered ovens are charged the next. The daily production cycle consists of charging the 60 ovens over one production shift. Since emissions from the ovens are essentially continuous, testing on the main stack could be performed anytime. The actual tests were scheduled such that the runs included both times of production (pushing and charging) and no production.

GECC utilizes the Jewell-Thompson heat recovery oven to manufacture metallurgical coke. In coke production the volatile fraction of the coal is driven off in a reducing atmosphere. Coke is essentially the remaining carbon and ash. In heat recovery ovens, all the coal volatiles

are oxidized by the heat that is generated by the coking process. The waste exhaust gases generated by the coke ovens are ducted to heat recovery steam generators (HRSG) that recover heat from the oven waste gases and are used to super heat steam that drives a power generating turbine. After passing through the HRSGs the cooled gases pass through a lime spray dryer/baghouse system prior to being exhausted from the main stack.

Table 1-1 summarizes the results of the tests performed on the main baghouse stack during the compliance test. The test results demonstrate that the Main Stack is in compliance with all limits.

Table 1-1
Compliance Demonstration
Stack Tests at Gateway Energy & Coke Company (May 30, 2012)

Emission Unit	Pollutant	Emission Limit	Measured Value	Comply?
Main Stack Baghouse	Filterable PM	0.005 gr/dscf	0.0025 gr/dscf	Yes
	PM_{10} [a]	28.3 lb/hour and 0.011 gr/dscf	7.52 lb/hour and 0.0037 gr/dscf	Yes
	$PM_{2.5}$ [b]	N/A	6.60 lb/hour and 0.0032 gr/dscf	N/A
	Lead	0.02 lb/hour	0.005 lb/hour	Yes
	NO_x	125 lb/hour	94.01 lb/hour	Yes
	CO	26.2 lb/hour	0.74 lb/hour	Yes
	VOM	5.6 lb/hour	<0.01 lb/hour [c]	Yes

[a] Includes $PM_{2.5}$ and condensable PM.
[b] Includes condensable PM.
[c] VOM was non-detectable at 0.1 ppm.

2. TEST RESULTS

The results of the stack tests for the main stack are provided in Table 2-1. Test run 3 was performed during production (pushing and charging).

Table 2-1
Main Stack Compliance Test Results

Parameters	Run 1	Run 2	Run 3	Average
Date	5/30/12	5/30/12	5/30/12	
Test Time	10:48 – 13:25	13:55 – 16:04	19:02 – 24:00	
Duration of Test (minutes)	120	120	120	120
Average Tons of Coal Charged per Oven	46.81	46.81	46.81	46.81
Stack Gas Temperature (°F)	297	285	262	281
Stack Gas Moisture Content (%)	22.1	21.2	20.3	21.2
O_2 (%)	5.1	5.5	7.5	6.0
CO_2 (%)	10.8	10.6	9.2	10.2
Gas Flowrate (as measured by the Method 5/12 sampling train)				
ACFM	433,109	404,402	425,365	420,959
DSCFM	231,524	222,364	243,821	232,570
Pretest Cyclonic Flow Check (degrees)				0.875
Particulate Matter				
Sample Volume (dscf)	73.130	68.095	73.511	71.579
Isokinetic (%)	102.5	99.4	97.8	99.9
Filterable PM Conc. (gr/dscf)	0.0021	0.0019	0.0034	0.0025
Filterable PM Emission Rate (lb/hour)	4.23	3.67	7.06	4.99
CPM , PM_{10}, $PM_{2.5}$				
Duration of Test (minutes)	119.7	117.5	123.4	120.2
Sample Volume (dscf)	40.399	41.666	42.083	41.383
Isokinetic (%)	104.1	113.7	101.1	106.3
PM_{10} Conc.(gr/dscf)	0.0035	0.0043	0.0032	0.0037
PM_{10} Emission Rate (lb/hour)	7.26	8.53	6.77	7.52
$PM_{2.5}$ Conc. (gr/dscf)	0.0031	0.0038	0.0027	0.0032
$PM_{2.5}$ Emission Rate (lb/hour)	6.31	7.58	5.91	6.60
CPM Conc.(gr/dscf)	0.0027	0.0036	0.0025	0.0029
CPM Emission Rate (lb/hour)	5.68	7.14	5.28	6.03
Lead				
Lead Conc. (ppm)	0.0007	0.0005	0.0007	0.0006
Lead Emission Rate (lb/hour)	0.005	0.004	0.005	0.005
Gaseous Emissions				
NO_x Concentration (ppm)	45.46	49.91	53.78	49.72
NO_x Emission Rate (lb/hour)	75.46	79.56	94.01	83.01
CO Concentration (ppm)	0.13	0.87	1.16	0.72
CO Emission Rate (lb/hour)	0.13	0.84	1.24	0.74
VOM Concentration (ppm – dry)	ND	ND	ND	ND
VOM Emission Rate (lb/hour)	ND	ND	ND	ND

3. TEST METHODS

The sampling methods used during the tests are summarized in Table 3-1.

Table 3-1
Test Method Summary

Pollutant	Test Method	Comment
Traverse point layout	EPA Method 1	
Gas flowrate	EPA Method 2	
Gas molecular weight	EPA Method 3A	Includes O_2 and CO_2.
Moisture	EPA Method 4	Included in isokinetic trains.
Filterable PM	EPA Method 5	Combined with Method 12.
Lead	EPA Method 12	Combined with Method 5.
Condensable PM	EPA Method 201	Combined with Method 202.
$PM_{10/2.5}$	EPA Method 202	Combined with Method 201.
NO_x	EPA Method 7E	
CO	EPA Method 10	
VOM	EPA Method 25A	

Each test method used for this compliance test program was based on standard methodology taken from the latest version of 40 Code of Federal Regulations (CFR) 60, Appendix A. These test methods were presented in the Intent to Test Notification submitted to IEPA prior to the compliance test except as noted. Detailed descriptions of the sampling trains and methods used are provided in the following sections.

3.1 EPA Reference Methods 1 and 2 – Volumetric Flow Rate

Environmental Protection Agency (EPA) Methods 1 and 2 were used to determine the sampling traverse layout and stack gas volumetric flow rate at the sampling location. A velocity traverse was conducted at discrete points during each test run at each designated traverse point. A calibrated S-type Pitot tube and an inclined manometer were used to measure the velocity pressure. A calibrated type "K" thermocouple was used to measure the stack gas temperature at each traverse point. Utilizing the measured stack gas molecular weight and the moisture content, the standard (Q_{std}) and actual volumetric flow rates were calculated in accordance with the formulas found in EPA Reference Method 2.

As part of the pre-test activities, measurements were made to determine whether cyclonic flow conditions were present in the stack. In order to determine the presence of cyclonic flow, a cyclonic flow check was performed according to EPA Method 1 sampling procedures. The cyclonic flow measurements performed on the stacks indicated that minimal cyclonic flow was present.

3.2 EPA Reference Method 3A – Stack Gas Molecular Weight

The stack gas oxygen (O_2) and carbon dioxide (CO_2) concentrations were determined in accordance with EPA Reference Method 3A using a Servomex 1400 O_2 and CO_2 gas analyzer. The resulting O_2 and CO_2 concentrations were used to calculate the molecular weight of the stack gas. A description of the sampling equipment used for this testing is provided in Section 3.6.

3.3 EPA Reference Method 4 – Stack Gas Moisture Content

The moisture content (%), B_{wo}, of the stack gas was determined in accordance with EPA Reference Method 4. The Method 4 sampling was incorporated with each Method 5/12 and 201/202 isokinetic sampling train used for the compliance testing. A detailed description of this sampling is included in Section 3.4.

3.4 EPA Reference Method 5 & 12 – Filterable Particulate Matter and Lead

The filterable PM testing was performed in accordance with EPA Method 5. The PM sampling was performed by extracting a sample of the stack exhaust gas stream through a Teflon-lined stainless steel button-hook nozzle attached to heated glass liner encased in a stainless steel sampling probe. The probe was attached to a heated, glass filter holder containing a pre-weighed, quartz-fiber filter. The filter heater box and sample probe were maintained at a temperature of 248 ^{o}F $\pm$25 ^{o}F. After leaving the filter holder, the gas stream sample passed through an impinger train set up according to EPA Method 5 guidelines.

The sample train was modified in order to collect both filterable PM and lead in the same train as allowed by EPA Method 12. The only modification on the Method 5 sampling train

required to include lead was replace the water normally placed in the first two impingers with 0.1N nitric acid. The first impinger was a modified Smith-Greenburg containing 100 ml of 0.1N nitric acid. The second impinger was a Smith-Greenburg also containing 100 ml of 0.1N nitric acid. The third impinger was a modified Smith-Greenburg that was initially left empty. The fourth impinger was a modified Smith-Greenburg containing approximately 200 grams of indicating silica gel. Prior to performing the test run, the impingers were weighed before assembling the sample train.

The outlet of the fourth impinger was connected to a last impinger connector containing an immersed thermocouple used to measure the gas sample temperature as it exited the sampling train. The last impinger connecter was attached to a flexible umbilical cord that carried the sample gas to the control console prior to being exhausted to atmosphere. The control console contained the sample pump, dry gas meter, calibrated orifice meter, thermocouple readouts, and heat controls for the sampling train. Figure 3-1 is a schematic of the Method 5/12 sample train.

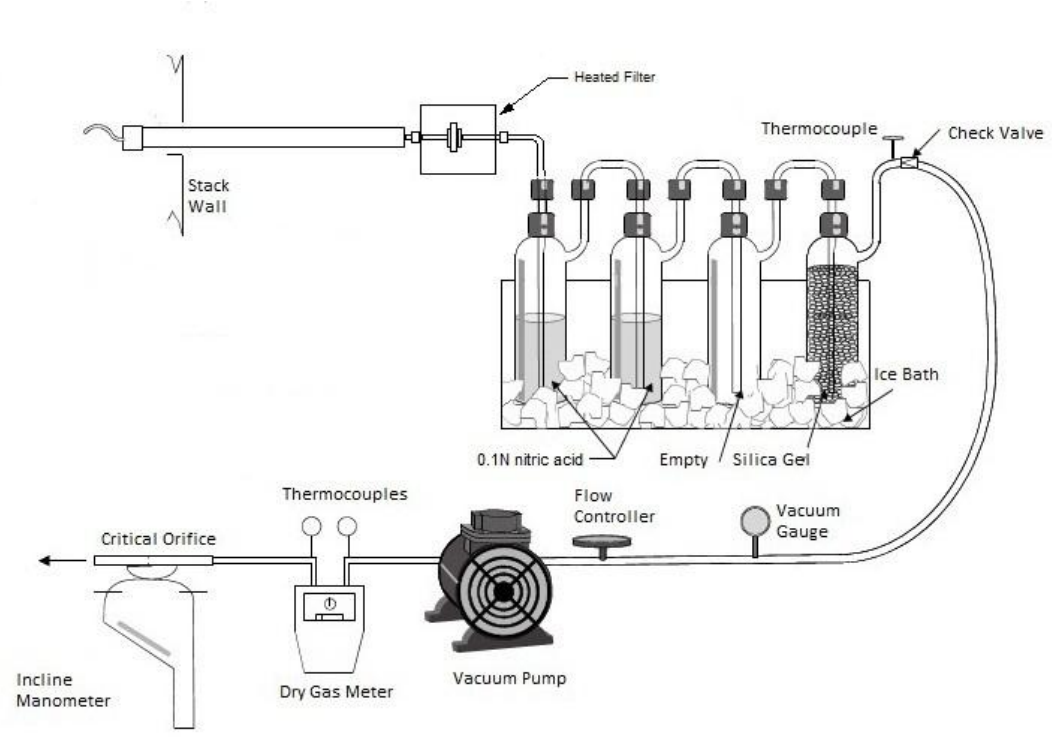


Figure 3-1. Schematic of Method 5/12 Sample Train

Sampling was performed by placing the sample probe into the stack and locating the nozzle at the first sample traverse point. The test run was started and a sample of stack gas was drawn into the sample train at a pre-determined isokinetic sampling rate based on the measured stack gas flow rate and temperature taken at each sample point. A total of 24 sampling points equally divided between 4 sampling ports were used to collect a representative sample across the stack.

At the conclusion of the PM/Lead test run the sample train probe was removed from the stack and a final leak check performed. After the leak check, the sample train was recovered using the procedures described below:

- Nozzle and Probe – The nozzle and probe was rinsed and brushed three times using reagent grade acetone. The rinsate was collected into a sample container. The nozzle and probe were then rinsed with 0.1N nitric acid into a separate sample container.

- Filter Holder – The filter was removed from the filter holder and placed into a Petri dish. The Petri dish was sealed with Teflon tape to prevent loss or contamination of the sample. The front half of the filter holder was then rinsed and brushed three times with reagent grade acetone. The acetone rinsate was then added to the nozzle/probe wash sample collection container. The glassware was then rinsed with 0.1N nitric acid into the separate 0.1N nitric acid nozzle/probe wash sample container.

- Impingers – Each impinger was removed from the sample train and weighed to determine moisture gain. The contents of the first three impingers were transferred to a sample storage container. They were then rinsed with 0.1N nitric acid and the rinse was added to the impinger sample container. The silica gel in the fourth impinger was recovered for regeneration.

A sample of the acetone and 0.1N nitric acid used in the sample train recovery was collected for a reagent blank. The reagent blanks were analyzed in the same manner as the field samples.

The filters and probe washes will be analyzed by URS as described below.

- Filter – The filter was analyzed by opening the petri dish containing the filter and placing the Petri dish into a desiccator and dried for a minimum of 24 hours. The filter was then weighed twice or until a constant weight was achieved.

- Probe Wash – The acetone probe wash, and acetone reagent blank, were emptied into pre-weighed sample dishes. The samples were then allowed to dry at ambient temperature and pressure inside a laboratory hood. Once dried, the sample dishes were placed into a desiccator and dried for a minimum of 24 hours. The sample dishes were then weighed twice or until a constant weight was achieved.

  After the probe washes were analyzed, an aliquot of 50 ml of 0.1N nitric acid was poured into each sample dish to rehydrate the probe wash. The samples were then poured into the corresponding 0.1N nitric acid probe wash sample containers for each test run. The combined probe wash samples were then delivered to Test America for subsequent lead analysis along with the filters.

The weight gain of the acetone blank was subtracted from the acetone probe wash weight gain. The corrected probe wash weight gain was added to the weight gain of the filter. This combined weight gain was used to calculate the PM concentration and mass emission rate. The results from the lead analysis were used to calculate the mass emission rate for lead.

3.5 EPA Method 201/202 – PM_{10} / $PM_{2.5}$ & CPM

The PM_{10} and $PM_{2.5}$ fractions of PM in the main stack, along with condensable particulate matter were measured using an EPA Method 201/202 sampling train. The 201/202 sampling train consisted of a Method 201 two-stage cyclone separator head attached to the probe of a Method 2025 sampling train. The cyclones are designed to allow particles smaller than a certain diameter to pass through the cyclone, with the larger particles being trapped in a collection cup located at the bottom of the cyclone. The first cyclone separated out particles

larger than 10 microns and the second stage cyclone separated out particles larger than 2.5 microns. The sampling rate at which the test was run was based on a pre-calculated nozzle diameter provided in the test method. The sampling rate remains at the same rate at each sample traverse point, and the amount of time at each sample traverse point is determined by the Delta P measured divided by the total Delta P readings for all the sample traverse points.

The 202 sampling train consisted of four glass impingers. Figure 3-2 is a schematic of the EPA Method 201/202 sample train. The first impinger was a short-stemmed modified Smith-Greenburg which was initially left empty. The second impinger was a long-stemmed modified Smith-Greenburg which was also empty. These two impingers were placed into a container of ambient-temperature water. A jacketed coil condenser was connected from the outlet of the sample probe to the inlet of the first impinger. Water from the water container was circulated through the coil condenser during the test run.

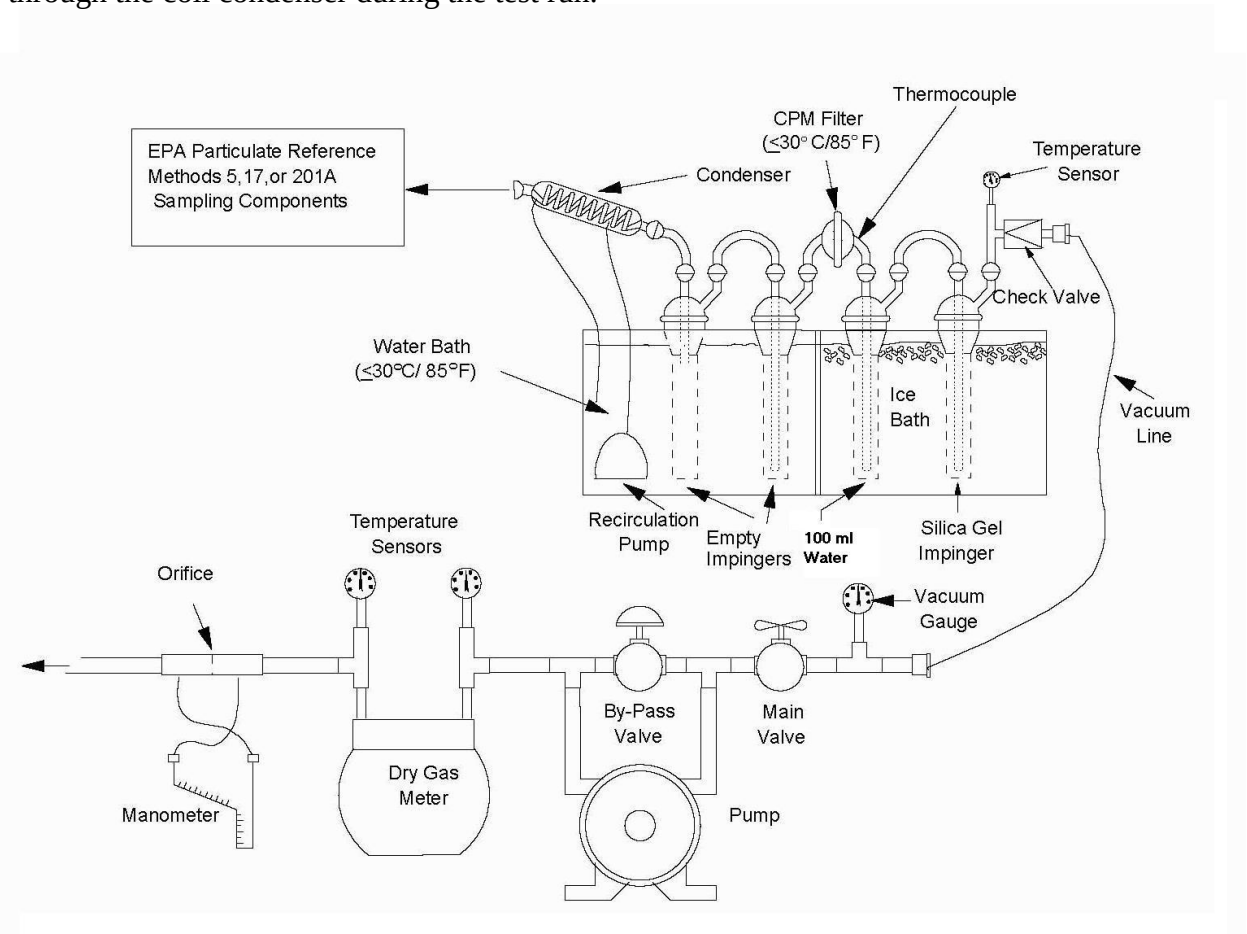


Figure 3-2. Schematic of EPA Method 201/202 Sample Train

The outlet of the second impinger was connected to a glass filter holder containing a Teflon membrane filter. The outlet of the filter holder was connected to the inlet of impinger number 3, which was a modified Smith-Greenburg containing 100 ml of distilled water. The outlet of the third impinger was connected to the inlet of impinger number four, which was a modified Smith-Greenburg containing approximately 200 grams of indicating silica gel. The remainder of the sample train was identical to the EPA Method 5 sampling previously described.

At the conclusion of each 201/202 sample test run, the sample head was disassembled and the PM fraction between the 10 micron and 2.5 micron heads was recovered as the PM_{10} sample. The PM fraction between the 2.5 micron head and the final filter was collected and is representative of the $PM_{2.5}$ sample.

The impinger train was recovered by replacing the short stem in the first impinger with a standard modified stem and connecting the inlet of the first impinger to a bottle of ultra-pure nitrogen. The train was then purged with nitrogen at a rate of 14 L/minute for one hour. At the conclusion of the purge, the short stem was placed back into the first impinger and the train was disassembled and weighed for moisture determination. After the impingers were weighed, the contents of the first two impingers were transferred into a sample container. The impingers were rinsed with distilled water and the rinsate was added to the sample container. The Teflon filter was then removed from the filter holder and placed into a petri dish and sealed. The front of the filter holder was rinsed with distilled water and the rinsate was added to the impinger sample container. The contents of the third impinger were discarded and the silica gel in the fourth impinger was collected for regeneration.

The Method 202 impinger samples were sent to Enthalpy Analytical for subsequent analysis for organic and inorganic condensable particulate matter according to Method 22 analytical requirements.

In order to determine the mass emission rates of PM_{10}, $PM_{2.5}$ and CPM, the calculated mass emissions of CPM were added to the $PM_{2.5}$ emissions. The PM_{10} mass emission rate was calculated by adding the emissions of both the CPM and $PM_{2.5}$ to the PM_{10} emissions.

3.6 Gaseous Sampling

A single continuous emission monitor (CEM) sampling system was utilized to perform gaseous sampling on the main stack. The sampling system consisted of a heated metal probe that was used to extract the gas sample from the main stack. A heated 3/8-inch Teflon line transported the sample from the point of extraction to the non-contact gas conditioning chiller system. The moisture was condensed and removed from the gas stream, while the pollutant passed through to the gaseous analyzers. Just prior to the inlet of the gas conditioner, a separate insulated sample line was used to extract a smaller sample of stack gas for the volatile organic matter (VOM) CEM. The VOM CEM requires the sample gas to remain above the moisture dew point for proper analysis. Each analyzer was located in a temperature-controlled sampling trailer to minimize thermal affects on the calibration of the instruments. Each reference method CEM was connected to an Environmental Systems Corporation datalogger for collection of data. One-minute averages of each reference method CEM was recorded throughout the compliance test period.

The concentration and mass emission rate of nitrogen oxide (NO_x), carbon monoxide (CO) and VOM in the gas stream were measured and reported in parts per million by volume (ppmv) on a dry basis, and in pounds per hour, respectively. The emission rate was calculated using the specific run-time average concentration in ppmv, the dry standard volumetric flow rate and the Ideal Gas Law.

The NO_x concentration for the main stack was sampled using a TECO chemiluminescent NO-NO_x gas analyzer. The NO_x sampling conformed to procedures presented in EPA 40 CFR 60, Appendix A, Method 7E.

The CO concentrations were sampled and determined using an API Model 300E gas filter correlation analyzer. The CO sampling conformed to procedures presented in 40 CFR 60, Appendix A, Method 10.

The VOM concentrations were sampled using a JUM Flame Ionizing Detector gas analyzer. The VOM sampling conformed to procedures presented in EPA 40 CFR 60, Appendix

A, Method 25A. Figure 3-3 is a schematic of the CEM sampling system.

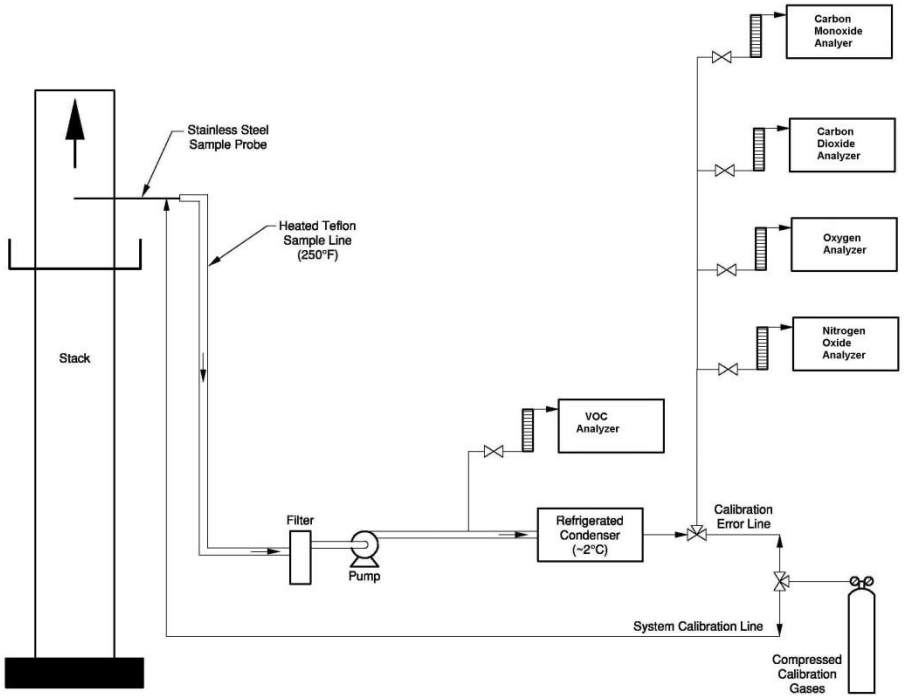


Figure 3-3. Schematic of CEM Sampling System

Prior to performing the compliance test, the CEMs were calibrated with a zero nitrogen gas along with a mid-level and high-level Relative Accuracy Test Audit (RATA) class calibration gases. Section 4.6 describes the methodology used for CEM calibration. A stratification check for each stack gas that was monitored was performed across the main stack. No significant stratification was found in the stack, which allowed the CEM sampling to be performed at a single point within the stack.

4. QUALITY ASSURANCE/QUALITY CONTROL

The objective of URS's QA Program is to ensure the accuracy and precision, as well as reliability, of the data collected and generated for URS's clients and to meet the data quality objectives of regulatory or accrediting bodies. Management, administrative, statistical, investigative, preventive, and corrective techniques were employed to maximize the reliability of data.

A strict QA/QC program was adhered to during the performance testing. Before actual sampling on-site, all the sampling equipment was thoroughly checked to ensure that each component was clean and operable. Any damaged or faulty equipment was tagged and removed from service until it could be repaired. If any corrective actions were taken in response to these QC checks or in response to supervisor review of QC procedures, the corrective action taken was documented in a field QA/QC logbook.

Proper equipment calibration is essential in maintaining the desired data quality level. All calibrations of the equipment used in the stack sampling portion of the testing conformed to the guidelines outlined in the EPA QA handbook, *Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods* (EPA-600/4-77-027a). The following sections give a synopsis of the calibration procedures for the main components of the stack sampling systems.

4.1 Dry Gas Meters/Orifice Meters

The dry gas meter and critical orifice in the control console used during the testing were calibrated before and after the compliance test to ensure accurate measurements of the sample gas volumes. The dry gas meter and critical orifice are normally housed as a set inside each control console and were calibrated as such. The dry gas meter was calibrated against a secondary standard dry gas meter, which is a calibrated annually against a primary standard wet test meter.

The dry gas meter was calibrated at predetermined, nominal volume flow settings. For each of these flow rates, an accuracy ratio factor to the calibration standard (Y_i) was computed

for the dry gas meter. A successful calibration for a particular dry gas meter would be achieved if each value of Y_i was within 2% of the average value of Y_i ($Y_i = Y \pm 0.02Y$).

In order to establish calibration for the critical orifice, a calibration coefficient ($\Delta H@_I$) was calculated for each flow rate. This coefficient is the orifice pressure differential (in inches H_2O) at a distinct orifice manometer setting that gives a flow of 0.75 ft^3/min of air at standard conditions. The desired tolerance for this coefficient is ±0.2 of the average value of the four values of $\Delta H@_I$ ($\Delta H@ \pm 0.2$). If any of the pre-test calibration coefficients for a particular critical orifice violates the acceptance criteria, the critical orifice in question would be replaced and calibrated.

4.2 Thermocouples and Thermocouple Readouts

All thermocouples used during the stack sampling tests were calibrated to ensure accurate temperature measurements. All the sensors utilized were type "K" thermocouples, which have a working range of approximately -300 °F to approximately 2,500 °F. These sensors were used in the measurement of stack gas temperature, probe temperature, filter box temperature, and impinger train outlet temperature. The thermocouples were calibrated against an NITS traceable, mercury-in-glass thermometer at predetermined temperatures. In order to obtain the calibration data from each sensor a single, recently calibrated, thermocouple readout was used.

The thermocouple readout contained in the control console used during the testing was calibrated using a thermocouple temperature simulator. This calibration apparatus generates a voltage signal that mimics the signal an ideal "K" type thermocouple would exhibit at a particular temperature. The signal can be changed via a slide switch. The readout was calibrated at 10 different points from 200 °F through 2,000 °F, at increments of 200 °F.

4.3 Barometer

The field barometer used during the test was an electronic barometer. This barometer was calibrated by comparing it to a standard mercury column barometer and adjusting it if any deviation existed between it and the standard. This exercise was performed both before and after the testing activities.

4.4 Analytical Balance

The field analytical balance that was used to weigh the impingers was checked before building and recovering the sample trains using certified standard weights. The balance used to weigh the filters and probe wash cups was calibrated with S-class certified weights prior to weighing the samples.

4.5 Pitot Tubes

To ensure accurate measurements of the exhaust gas flow, the S-type Pitot tubes used during the compliance testing were calibrated against a standard Pitot tube using a wind tunnel. The basis for the calibration is described in 40 CFR 60, Appendix A, Method 2.

4.6 Continuous Emission Monitors

The reference method analyzers were calibrated with EPA-approved RATA Class calibration gases prior to the beginning of the test series and after each compliance test run. The initial calibration error checks were performed at the beginning of the test run series in accordance with the specific reference method applicable to the analyzer. After the successful completion of the initial calibration error check, a system bias check was performed.

Zero, mid, and high point calibration bias checks were performed prior to the beginning of the compliance test runs. The bias check is a comparison of instrument response to gas introduced into the analyzer with gases routed throughout the entire sampling system. The maximum allowable bias is 5% of the span. After the bias check was performed, the analyzers were not adjusted during the compliance tests, unless an analyzer failed the drift check. No analyzers failed the drift check.

The drift checks were performed on each analyzer by introducing the mid-range calibration gas and the zero nitrogen. The maximum allowable calibration drift is 3% of the span. Calibration drift was determined by comparing the before run and after run values. The test data values were corrected for bias and calibration drift. The following calculation, as cited in the

reference method, was used to correct the measured concentrations for bias and instrument calibration drifts:

$$C_{gas} = (C_{anz} - C_o)\frac{C_{ma}}{(C_m - C_o)}$$

Where:

C_{gas} = effluent gas concentration, dry basis, ppmv;
C_{anz} = average gas concentration indicated by the gas analyzer, dry basis, ppmv;
C_o = average of initial and final system calibration bias check responses for the zero gas, ppmv;
C_m = average of initial and final system calibration bias check responses for the upscale calibration gas, ppmv;
C_{ma} = actual concentration of the upscale calibration gas, ppmv.

Response time tests were performed in conjunction with the bias checks. The response time test was performed by measuring the time it took for each analyzer to reach 95% of the concentration of the high range calibration gas. The zero gas was then introduced into the sample system, and the amount of time it took for the analyzer to reach a 95% reduction in scale reading was measured. The greater of these two readings was recorded as the response time for that analyzer.

Appendix A

Plant Data

GA[illegible]AY ENERGY & COKE COMPANY
PCM Shift Report

SHIFT START DATE: 5/28/12 OPERATOR 1: A Dennison OPERATOR 2: A Wagoner

Oven Number	Charge Time	Tons Charged	Oven Damage	Door/Lintel Damage	Door Fire - Coal Side: Door Fire?	Door Fire - Coal Side: Fire Out Time	Fan Amps	Charge Pressure	Comments:
84	1958	46.5	Y / N	DOOR / LINTEL	Y / N		136	2500	
88	1905	48	Y / N	DOOR / LINTEL	Y / N		133	2700	
92	1913	48	Y / N	DOOR / LINTEL	Y / N		133	2700	
96	1920	47.5	Y / N	DOOR / LINTEL	Y / N		133	2600	- false door came out lost ≈ 2 ton
100	1933	46.5	Y / N	DOOR / LINTEL	Y / N		132	2500	
104	1943	46.5	Y / N	DOOR / LINTEL	Y / N		134	2500	- unable to throw bottom E latch
108	1950	48	Y / N	DOOR / LINTEL	Y / N		133	2700	
112	2006	48	Y / N	DOOR / LINTEL	Y / N		134	2700	- unable to throw bottom E latch
116	2016	47.5	Y / N	DOOR / LINTEL	Y / N		132	2600	
120	2024	46.5	Y / N	DOOR / LINTEL	Y / N		132	2500	
1	2058	46.5	Y / N	DOOR / LINTEL	Y / N		133	2500	
5	2105	47.5	Y / N	DOOR / LINTEL	Y / N		131	2600	
9	2113	48	Y / N	DOOR / LINTEL	Y / N		132	2650	
13	2121	47.5	Y / N	DOOR / LINTEL	Y / N		131	2600	
17	2128	47.5	Y / N	DOOR / LINTEL	Y / N		132	2600	
21	2135	46.5	Y / N	DOOR / LINTEL	Y / N		130	2500	
25	2142	47.5	Y / N	DOOR / LINTEL	Y / N		130	2600	
29	2156	48	Y / N	DOOR / LINTEL	Y / N		132	2700	
33	2204	47.5	Y / N	DOOR / LINTEL	Y / N		131	2600	
37	2211	47	Y / N	DOOR / LINTEL	Y / N		130	2650	
41	2230	46.5	Y / N	DOOR / LINTEL	Y / N		133	2500	
45	2237	47.5	Y / N	DOOR / LINTEL	Y / N		132	2600	
49	2244	48	Y / N	DOOR / LINTEL	Y / N		133	2700	
53	2256	47.5	Y / N	DOOR / LINTEL	Y / N		133	2600	- unable to throw bottom E latch
57	2304	47.5	Y / N	DOOR / LINTEL	Y / N		133	2600	
61	2311	46.5	Y / N	DOOR / LINTEL	Y / N		132	2500	
65	2321	47.5	Y / N	DOOR / LINTEL	Y / N		133	2600	
69	2326	48	Y / N	DOOR / LINTEL	Y / N		132	2700	
73	2336	47.5	Y / N	DOOR / LINTEL	Y / N		131	2600	
77	2344	47	Y / N	DOOR / LINTEL	Y / N		130	2650	
81	0113	46.5	Y / N	DOOR / LINTEL	Y / N		138	2500	
85	0119	47.5	Y / N	DOOR / LINTEL	Y / N		133	2600	
89	0125	48	Y / N	DOOR / LINTEL	Y / N		132	2700	
93	0131	47.5	Y / N	DOOR / LINTEL	Y / N		129	2600	
97	0138	46.5	Y / N	DOOR / LINTEL	Y / N		131	2500	
101	0152	46.5	Y / N	DOOR / LINTEL	Y / N		133	2500	
105	0158	47.5	Y / N	DOOR / LINTEL	Y / N		133	2600	
109	0211	48	Y / N	DOOR / LINTEL	Y / N		132	2700	
113	0217	47.5	Y / N	DOOR / LINTEL	Y / N		130	2600	
117	0223	46.5	Y / N	DOOR / LINTEL	Y / N		129	2500	

[Differential Pressure must be recorded once per shift and must fall within the range of 2.0 to 12.0. If it is not, corrective action is required. Notify Maintenance and Shift Leader immediately.]

Door Fire Correction Steps

1) Ensure Uptake is Open (Radio Control Room)

2) Tighten Door

3) Notify Product Tech to take further actions as neccesary.

PCM Inspection

5S Rating	2	Water Pressure		145	Chain Condition	OK	Comments
Hydraulic Oil Spill	Y / N	A/C Working		Y / N	Baghouse DP Reading	9.1	
Window Condition	S / U	Cameras Working		Y / N	Date/Time of Baghouse DP	5/28/12 2057	

9L

ENSURE TO MINIMIZE THE WATER DISCHARGE FROM THE PCM ANYTIME ACTUAL PRODUCTION IS NOT GOING ON BY EITHER CLOSING THE REAR DISCHARGE VALVE OR TAKING THE WATER SUPPLY VALVE INTO HAND AND SETTING IT AT 100% (Visually check Discharge of Water)

INITIAL

GAY ENERGY & COKE COMPANY

PCM Shift Report

SHIFT START DATE: 5/28/12 OPERATOR 1: A Dennison OPERATOR 2: A Wagoner

Oven Number	Charge Time	Tons Charged	Oven Damage	Door/Lintel Damage	Door Fire - Coal Side: Door Fire?	Door Fire - Coal Side: Fire Out Time	Fan Amps	Charge Pressure	Comments:
3	0253	46.5	Y / (N)	DOOR / LINTEL	Y / (N)		130	2500	
7	0302	47.5	Y / (N)	DOOR / LINTEL	Y / (N)		127	2600	
11	0309	48	Y / (N)	DOOR / LINTEL	Y / (N)		128	2700	
15	0317	47.5	Y / (N)	DOOR / LINTEL	Y / (N)		128	2600	
19	0325	47	Y / (N)	DOOR / LINTEL	Y / (N)		126	2550	
23	0333	47	Y / (N)	DOOR / LINTEL	Y / (N)		125	2550	
27	0341	47.5	Y / (N)	DOOR / LINTEL	Y / (N)		125	2600	
31	0349	48	Y / (N)	DOOR / LINTEL	Y / (N)		124	2700	
35	0357	47.5	Y / (N)	DOOR / LINTEL	Y / (N)		124	2600	
39	0405	46.5	Y / (N)	DOOR / LINTEL	Y / (N)		124	2500	
43	0419	46.5	Y / (N)	DOOR / LINTEL	Y / (N)		129	2500	
47	0431	47.5	Y / (N)	DOOR / LINTEL	Y / (N)		132	2600	
51	0437	48	Y / (N)	DOOR / LINTEL	Y / (N)		129	2700	
55	0443	47.5	Y / (N)	DOOR / LINTEL	Y / (N)		129	2600	
59	0455	47	Y / (N)	DOOR / LINTEL	Y / (N)		132	2600	
63	0501	47	Y / (N)	DOOR / LINTEL	Y / (N)		131	2600	
67	0509	47.5	Y / (N)	DOOR / LINTEL	Y / (N)		132	2600	
71	0514	48	Y / (N)	DOOR / LINTEL	Y / (N)		129	2700	
75	0527	47.5	Y / (N)	DOOR / LINTEL	Y / (N)		131	2600	
79	0539	46.5	Y / (N)	DOOR / LINTEL	Y / (N)		135	2500	
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				

[Differential Pressure must be recorded once per shift and must fall within the range of *2.0 to 12.0*. If it is not, corrective action is required. Notify Maintenance and Shift Leader immediately.]

Door Fire Correction Steps

1) Ensure Uptake is Open (Radio Control Room)

2) Tighten Door

3) Notify Product Tech to take further actions as necessary.

PCM Inspection

5S Rating	2	Water Pressure	145	Chain Condition	OK	Comments
Hydraulic Oil Spill	Y / (N)	A/C Working	(Y) / N	Baghouse DP Reading	9.2	
Window Condition	(S) / U	Cameras Working	(Y) / N	Date/Time of Baghouse DP	5/29/12 0253	

ENSURE TO MINIMIZE THE WATER DISCHARGE FROM THE PCM ANYTIME ACTUAL PRODUCTION IS NOT GOING ON BY EITHER CLOSING THE REAR DISCHARGE VALVE OR TAKING THE WATER SUPPLY VALVE INTO HAND AND SETTING IT AT 100% (Visually check Discharge of Water)

INITIAL

GATEWAY ENERGY & COKE COMPANY

PCM Shift Report

SHIFT START DATE: 5/29/12 OPERATOR 1: C. Logue OPERATOR 2: AL Dennison

Oven Number	Charge Time	Tons Charged	Oven Damage	Door/Lintel Damage	Door Fire - Coal Side: Door Fire?	Door Fire - Coal Side: Fire Out Time	Fan Amps	Charge Pressure	Comments:
83	1934	46.5	Y (N)	DOOR / LINTEL	Y (N)		132	2500	
87	1942	47.5	Y (N)	DOOR / LINTEL	Y (N)		133	2600	
91	1950	48	Y (N)	DOOR / LINTEL	Y (N)		130	2700	
95	1958	47.5	Y (N)	DOOR / LINTEL	Y (N)		127	2600	
99	2006	46.5	Y (N)	DOOR / LINTEL	Y (N)		127	2500	
103	2014	46.5	Y (N)	DOOR / LINTEL	Y (N)		127	2500	
107	2022	47.5	Y (N)	DOOR / LINTEL	Y (N)		126	2600	
111	2031	48	Y (N)	DOOR / LINTEL	Y (N)		126	2700	
115	2039	47.5	Y (N)	DOOR / LINTEL	Y (N)		126	2600	
119	2047	46.5	Y (N)	DOOR / LINTEL	Y (N)		127	2500	
2	2119	46.5	Y / (N)	DOOR / LINTEL	Y / (N)		132	2500	
6	2127	47.5	Y / (N)	DOOR / LINTEL	Y (N)		130	2600	
10	2134	48	Y / (N)	DOOR / LINTEL	Y (N)		131	2700	
14	2143	47.5	Y / (N)	DOOR / LINTEL	Y / (N)		130	2600	
18	2150	47	Y / (N)	DOOR / LINTEL	Y / (N)		129	2550	
22	2158	46.5	Y / (N)	DOOR / LINTEL	Y / (N)		129	2500	
26	2205	47.5	Y / (N)	DOOR / LINTEL	Y / (N)		127	2600	
30	2213	48	Y / (N)	DOOR / LINTEL	Y / (N)		127	2700	
34	2229	47.5	Y / (N)	DOOR / LINTEL	Y / (N)		130	2600	
38	2240	46.5	Y / (N)	DOOR / LINTEL	Y / (N)		130	2500	
42	2253	46.5	Y (N)	DOOR / LINTEL	Y (N)		131	2500	
46	2300	47.5	Y (N)	DOOR / LINTEL	Y (N)		130	2600	
50	2307	48	Y (N)	DOOR / LINTEL	Y (N)		130	2700	
54	2314	47.5	Y / (N)	DOOR / LINTEL	Y (N)		130	2600	
58	2321	47	Y / (N)	DOOR / LINTEL	Y (N)		129	2500	
62	2328	46.5	Y / (N)	DOOR / LINTEL	Y (N)		127	2500	
66	2335	47.5	Y (N)	DOOR / LINTEL	Y (N)		126	2600	
70	2343	48	Y (N)	DOOR / LINTEL	Y (N)		126	2700	
74	2353	47.5	Y (N)	DOOR / LINTEL	Y (N)		127	2600	
78	0002	46.5	Y / (N)	DOOR / LINTEL	Y (N)		125	2500	
82	0128	46.5	Y / (N)	DOOR / LINTEL	Y / (N)		1356	2500	
86	0138	47.5	Y / (N)	DOOR / LINTEL	Y / (N)		133	2600	
90	0150	48	Y / (N)	DOOR / LINTEL	Y / (N)		132	2700	bottom E latch
94	0158	47.5	Y / (N)	DOOR / LINTEL	Y / (N)		131	2600	
98	0205	46.5	Y / (N)	DOOR / LINTEL	Y / (N)		130	2500	
102	0212	46.5	Y / (N)	DOOR / LINTEL	Y / (N)		132	2500	
106	0220	47.5	Y / (N)	DOOR / LINTEL	Y / (N)		131	2600	
110	0227	48	Y / (N)	DOOR / LINTEL	Y / (N)		130	2700	
114	0234	47.5	Y / (N)	DOOR / LINTEL	Y / (N)		129	2600	
118	0241	46.5	Y / (N)	DOOR / LINTEL	Y / (N)		131	2500	

[Differential Pressure must be recorded once per shift and must fall within the range of *2.0 to 12.0*. If it is not, corrective action is required. Notify Maintenance and Shift Leader immediately.]

Door Fire Correction Steps

1) Ensure Uptake is Open (Radio Control Room)

2) Tighten Door

3) Notify Product Tech to take further actions as necessary.

PCM Inspection

						Comments
5S Rating	2	Water Pressure	145	Chain Condition	OK	
Hydraulic Oil Spill	Y / (N)	A/C Working	(Y) N	Baghouse DP Reading	9.3	
Window Condition	(S) U	Cameras Working	(Y) / N	Date/Time of Baghouse DP	1958 5/29/12	

ENSURE TO MINIMIZE THE WATER DISCHARGE FROM THE PCM ANYTIME ACTUAL PRODUCTION IS NOT GOING ON BY EITHER CLOSING THE REAR DISCHARGE VALVE OR TAKING THE WATER SUPPLY VALVE INTO HAND AND SETTING IT AT 100% (Visually check Discharge of Water)

INITIAL

GATEWAY ENERGY & COKE COMPANY

PCM Shift Report

SHIFT START DATE: 5/29/12 OPERATOR 1: C Logue OPERATOR 2: AL Dennison

Oven Number	Charge Time	Tons Charged	Oven Damage	Door/Lintel Damage	Door Fire - Coal Side: Door Fire?	Door Fire - Coal Side: Fire Out Time	Fan Amps	Charge Pressure	Comments:
4	325	47	Y / (N)	DOOR / LINTEL	Y / (N)		132	2500	
8	334	48	Y / (N)	DOOR / LINTEL	Y / (N)		130	2700	
12	342	48	Y / (N)	DOOR / LINTEL	Y / (N)		131	2700	
16	352	47.5	Y / (N)	DOOR / LINTEL	Y / (N)		127	2600	
20	400	46.5	Y / (N)	DOOR / LINTEL	Y / (N)		128	2500	
24	409	47	Y / (N)	DOOR / LINTEL	Y / (N)		130	2600	
28	418	48	Y / (N)	DOOR / LINTEL	Y / (N)		129	2700	
32	426	48	Y / (N)	DOOR / LINTEL	Y / (N)		126	2700	
36	434	47.5	Y / (N)	DOOR / LINTEL	Y / (N)		127	2600	
40	442	46.5	Y / (N)	DOOR / LINTEL	Y / (N)		127	2500	
44	0505	47	Y / (N)	DOOR / LINTEL	Y / (N)		132	2550	
48	0511	48	Y / (N)	DOOR / LINTEL	Y / (N)		132	2700	
52	0520	48	Y / (N)	DOOR / LINTEL	Y / (N)		132	2700	bottom E latch
56	0527	47.5	Y / (N)	DOOR / LINTEL	Y / (N)		130	2600	
60	0533	46.5	Y / (N)	DOOR / LINTEL	Y / (N)		130	2500	
64	0546	47	Y / (N)	DOOR / LINTEL	Y / (N)		132	2550	
68	0555	48	Y / (N)	DOOR / LINTEL	Y / (N)		131	2700	
72	0602	48	Y / (N)	DOOR / LINTEL	Y / (N)		130	2700	
76	0609	47.5	Y / (N)	DOOR / LINTEL	Y / (N)		130	2600	
80	0619	46.5	Y / (N)	DOOR / LINTEL	Y / (N)		131	2500	
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				

[Differential Pressure must be recorded once per shift and must fall within the range of *2.0 to 12.0*. If it is not, corrective action is required. Notify Maintenance and Shift Leader immediately.]

Door Fire Correction Steps

1) Ensure Uptake is Open (Radio Control Room)

2) Tighten Door

3) Notify Product Tech to take further actions as necessary.

PCM Inspection

						Comments
5S Rating	2	Water Pressure	145	Chain Condition	OK	
Hydraulic Oil Spill	Y / (N)	A/C Working	(Y) N	Baghouse DP Reading	9.2	
Window Condition	(S) / U	Cameras Working	(Y) / N	Date/Time of Baghouse DP	5/30/12 09:39	

ENSURE TO MINIMIZE THE WATER DISCHARGE FROM THE PCM ANYTIME ACTUAL PRODUCTION IS NOT GOING ON BY EITHER CLOSING THE REAR DISCHARGE VALVE OR TAKING THE WATER SUPPLY VALVE INTO HAND AND SETTING IT AT 100% (Visually check Discharge of Water)

INITIAL

GATEWAY ENERGY & COKE COMPANY

PCM Shift Report

SHIFT START DATE: 5-30-13 OPERATOR 1: Byrum OPERATOR 2: Fultz / Yount

Oven Number	Charge Time	Tons Charged	Oven Damage	Door/Lintel Damage	Door Fire - Coal Side: Door Fire?	Door Fire - Coal Side: Fire Out Time	Fan Amps	Charge Pressure	Comments:
84	19:01	46.5	Y /(N)	DOOR / LINTEL	Y /(N)		132	3500	
88	19:08	48	Y /(N)	DOOR / LINTEL	Y /(N)		131	2200	
92	19:15	48	Y /(N)	DOOR / LINTEL	Y /(N)		127	2700	
96	19:23	47.5	Y /(N)	DOOR / LINTEL	Y /(N)		127	2600	
100	19:30	46.5	Y /(N)	DOOR / LINTEL	Y /(N)		128	2500	
104	19:37	46.5	Y /(N)	DOOR / LINTEL	Y /(N)		129	2500	
108	19:43	48	Y /(N)	DOOR / LINTEL	Y /(N)		129	2700	
112	19:51	48	Y /(N)	DOOR / LINTEL	Y /(N)		126	2700	
116	19:58	47.5	Y /(N)	DOOR / LINTEL	Y /(N)		126	2600	
120	20:05	46.5	Y /(N)	DOOR / LINTEL	Y /(N)		123	2500	
1	11:27	46.5	Y /(N)	DOOR / LINTEL	Y /(N)		125	2500	
5	11:35	47.5	Y /(N)	DOOR / LINTEL	Y /(N)		129	2600	
9	11:43	48	Y /(N)	DOOR / LINTEL	Y /(N)		131	2700	
13	11:51	47.5	Y /(N)	DOOR / LINTEL	Y /(N)		132	2600	
17	11:59	47.5	Y /(N)	DOOR / LINTEL	Y /(N)		131	2600	
21	12:07	46.5	Y /(N)	DOOR / LINTEL	Y /(N)		130	2500	
25	12:23	47.5	Y /(N)	DOOR / LINTEL	Y /(N)		132	2600	
29	12:31	48	Y /(N)	DOOR / LINTEL	Y /(N)		131	2700	
33	12:38	47.5	Y /(N)	DOOR / LINTEL	Y /(N)		131	2600	
37	12:46	47	Y /(N)	DOOR / LINTEL	Y /(N)		131	2600	
41	12:56	46.5	Y /(N)	DOOR / LINTEL	Y /(N)		131	2500	
45	1:03	47.5	Y /(N)	DOOR / LINTEL	Y /(N)		132	2600	
49	1:09	48	Y /(N)	DOOR / LINTEL	Y /(N)		132	2700	
53	1:16	47.5	Y /(N)	DOOR / LINTEL	Y /(N)		132	2600	
57	1:22	47.5	Y /(N)	DOOR / LINTEL	Y /(N)		132	2600	
61	1:29	46.5	Y /(N)	DOOR / LINTEL	Y /(N)		132	2500	
65	1:37	47.5	Y /(N)	DOOR / LINTEL	Y /(N)		132	2600	
69	1:44	48	Y /(N)	DOOR / LINTEL	Y /(N)		131	2700	
73	1:51	47.5	Y /(N)	DOOR / LINTEL	Y /(N)		132	2600	
77	1:58	47	Y /(N)	DOOR / LINTEL	Y /(N)		131	2600	
81	2:26	46.5	Y /(N)	DOOR / LINTEL	Y /(N)		139	2600 2500	
85	2:33	47.5	Y /(N)	DOOR / LINTEL	Y /(N)		132	2600	
89	2:50	48	Y /(N)	DOOR / LINTEL	Y /(N)		135	2700	
93	2:57	47.5	Y /(N)	DOOR / LINTEL	Y /(N)		132	2600	
97	3:05	46.5	Y /(N)	DOOR / LINTEL	Y /(N)		131	2500	
101	3:12	46.5	Y /(N)	DOOR / LINTEL	Y /(N)		130	2500	
105	3:18	47.5	Y /(N)	DOOR / LINTEL	Y /(N)		131	2600	
109	3:26	48	Y /(N)	DOOR / LINTEL	Y /(N)		131	2700	
113	3:33	47.5	Y /(N)	DOOR / LINTEL	Y /(N)		132	2600	
117	3:41	46.5	Y /(N)	DOOR / LINTEL	Y /(N)		132	2510	

[Differential Pressure must be recorded once per shift and must fall within the range of *2.0 to 12.0*. If it is not, corrective action is required. Notify Maintenance and Shift Leader immediately.]

Door-Fire Correction Steps

1) Ensure Uptake is Open (Radio Control Room)

2) Tighten Door

3) Notify Product Tech to take further actions as necessary.

PCM Inspection

5S Rating	2	Water Pressure	OK	145	Chain Condition	OK
Hydraulic Oil Spill	Y /(N)	A/C Working		(Y)/ N	Baghouse DP Reading	9.1
Window Condition	(S)/ U	Cameras Working		(Y)/ N	Date/Time of Baghouse DP	5-30 7:20

Comments

ENSURE TO MINIMIZE THE WATER DISCHARGE FROM THE PCM ANYTIME ACTUAL PRODUCTION IS NOT GOING ON BY EITHER CLOSING THE REAR DISCHARGE VALVE OR TAKING THE WATER SUPPLY VALVE INTO HAND AND SETTING IT AT 100%(Visually check Discharge of Water)

INITIAL

GATEWAY ENERGY & COKE COMPANY

PCM Shift Report

SHIFT START DATE: 5-30-12 OPERATOR 1: Byrum OPERATOR 2: Fultz/Byrum

Oven Number	Charge Time	Tons Charged	Oven Damage	Door/Lintel Damage	Door Fire - Coal Side: Door Fire?	Door Fire - Coal Side: Fire Out Time	Fan Amps	Charge Pressure	Comments:
3	4:13	46.5	Y (N)	DOOR / LINTEL	Y (N)		136	2500	
7	4:22	47.5	Y (N)	DOOR / LINTEL	Y (N)		133	2600	
11	4:30	48	Y (N)	DOOR / LINTEL	Y (N)		132	2700	
15	4:38	47.5	Y (N)	DOOR / LINTEL	Y (N)		132	2600	
19	4:46	47	Y (N)	DOOR / LINTEL	Y (N)		131	2600	
23	4:53	47	Y (N)	DOOR / LINTEL	Y (N)		130	2600	
27	5:02	47.5	Y (N)	DOOR / LINTEL	Y (N)		129	2700	
31	5:09	48	Y (N)	DOOR / LINTEL	Y (N)		129	2700	
35	5:16	47.5	Y (N)	DOOR / LINTEL	Y (N)		130	2600	
39	5:23	46.5	Y (N)	DOOR / LINTEL	Y (N)		130	2600	
43	5:33	46.5	Y (N)	DOOR / LINTEL	Y (N)		130	2500	
47	5:40	47.5	Y (N)	DOOR / LINTEL	Y (N)		131	2600	
51	749	48	Y (N)	DOOR / LINTEL	Y (N)		130	2600	
55	7:43	47.5	Y (N)	DOOR / LINTEL	Y (N)		134	2500	
59	7:52	47	Y (N)	DOOR / LINTEL	Y (N)		131	2500	
63	8:01	47	Y (N)	DOOR / LINTEL	Y (N)		136	2520	
67	8:08	47.5	Y (N)	DOOR / LINTEL	Y (N)		133	2600	
71	8:15	48	Y (N)	DOOR / LINTEL	Y (N)		134	2600	
75	8:23	47.5	Y (N)	DOOR / LINTEL	Y (N)		134	2500	
79	8:31	46.5	Y (N)	DOOR / LINTEL	Y (N)		133	2500	
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				
			Y / N	DOOR / LINTEL	Y / N				

[Differential Pressure must be recorded once per shift and must fall within the range of 2.0 to 12.0. If it is not, corrective action is required. Notify Maintenance and Shift Leader immediately.]

Door Fire Correction Steps

1) Ensure Uptake is Open (Radio Control Room)

2) Tighten Door

3) Notify Product Tech to take further actions as necessary.

PCM Inspection

						Comments
5S Rating	≥ (5) 3	Water Pressure	145	Chain Condition	OK	
Hydraulic Oil Spill	Y / (N)	A/C Working	(Y) / N	Baghouse DP Reading	9.3	
Window Condition	(S) / U	Cameras Working	(Y) / N	Date/Time of Baghouse DP	5-30-12 4:14	

ENSURE TO MINIMIZE THE WATER DISCHARGE FROM THE PCM ANYTIME ACTUAL PRODUCTION IS NOT GOING ON BY EITHER CLOSING THE REAR DISCHARGE VALVE OR TAKING THE WATER SUPPLY VALVE INTO HAND AND SETTING IT AT 100%(Visually check Discharge of Water)

INITIAL
MV

			Slurry Flow (GPM)			Fabric Fliter DP (inH2O)		
Date	Start Time	Stop Time	Average	Min	Max	Average	Min	Max
5/30/2012	10:00	11:00	36.04	31.42	43.24	6.71	6.30	6.99
5/30/2012	11:00	12:00	37.98	31.11	45.57	6.65	6.23	7.09
5/30/2012	12:00	13:00	35.77	28.64	42.44	6.55	6.26	6.91
5/30/2012	13:00	14:00	33.61	29.15	39.48	6.49	6.17	6.80
5/30/2012	14:00	15:00	35.59	28.69	41.71	6.53	6.24	7.16
5/30/2012	15:00	16:00	32.82	25.52	40.00	6.67	6.25	6.94
5/30/2012	16:00	17:00	32.95	27.49	37.17	6.62	6.36	6.95
5/30/2012	17:00	18:00	30.99	25.48	36.79	6.63	6.27	6.96
5/30/2012	18:00	19:00	32.56	23.74	38.94	6.51	6.20	7.00
5/30/2012	19:00	20:00	39.31	32.60	44.05	6.52	6.24	6.82
5/30/2012	20:00	21:00	42.17	36.21	47.72	6.49	6.20	6.99
5/30/2012	21:00	22:00	34.26	29.90	37.88	6.48	6.19	6.89
5/30/2012	22:00	23:00	30.20	26.77	33.01	6.59	6.24	7.19
5/30/2012	23:00	0:00	29.97	22.04	38.18	6.63	6.23	6.99
5/31/2012	0:00	0:30	34.20	22.04	47.72	6.55	6.19	7.19

Appendix B

Method 5/12 & Method 202

Test Data

EPA METHOD 5/12

URS

SUMMARY OF RESULTS	
Project Name:	SunCoke
Project Number:	39400684.00001
Site Location:	GECC
Test Location:	Main Stack
Test Train:	Filterable PM

Parameters	Run - 1	Run - 2	Run - 3	Average
Run Times	10:48 - 13:25	13:55 - 16:04	19:02 - 24:00	
Date	5/30/2012	5/30/2012	5/30/2012	
Sample Time	120	120	120	
Vol. Sampled @ STP (ft3)	73.130	68.095	73.511	71.579
Moisture Content (% Vol.)	22.1	21.2	20.3	21.2
O2 (%)	5.1	5.5	7.5	6.0
CO2 (%)	10.8	10.6	9.2	10.2
Stack Gas Temperature (°F)	297	285	262	281
Stack Velocity (ft/min.)	3,263	3,047	3,205	3,171
Gas Flow Rate (ACFM)	433,109	404,402	425,365	420,959
Gas Flow Rate (SCFM)	297,182	282,033	306,036	295,084
Gas Flow Rate (DSCFM)	231,524	222,364	243,821	232,570
Percent Isokinetic	102.5	99.4	97.8	99.9
Particulate Conc. (Grains/DSCF)	0.0021	0.0019	0.0034	0.0025
Particulate Mass Rate (lb/hr)	4.23	3.67	7.06	4.99
Lead Conc. (ppm)	0.0007	0.0005	0.0007	0.0006
Lead Mass Rate (lbs/hr)	0.005	0.004	0.005	0.005

Project:	GECC
Project No.:	39400684
Source:	Main Stack
Test Date:	5/30/2012
Test I.D.	OTM-28

Parameters	Run # 1	Run # 2	Run # 3	Average
Sample Time	120	120	120	120
Vol. Sampled @ STP (ft3)	73.130	68.095	73.511	71.579
Moisture Content (% Vol.)	22.1	21.2	20.3	21.2
O2 (%)	5.1	5.5	7.5	6.0
CO2 (%)	10.8	10.6	9.2	10.2
Stack Gas Temperature (°F)	297	285	262	281
Stack Velocity (ft/min.)	3,263	3,047	3,205	3,171
Gas Flow Rate (ACFM)	433,109	404,402	425,365	420,959
Gas Flow Rate (SCFM)	297,182	282,033	306,036	295,084
Gas Flow Rate (DSCFM)	231,524	222,364	243,821	232,570
Percent Isokinetic	102.5	99.4	97.8	99.9
Particulate Conc. (Grains/DSCF)	0.0021	0.0019	0.0034	0.0025
Particulate Conc. (MG/DSCM)	4.8766	4.4075	7.7333	5.6725
Particulate Mass Rate (pounds/hr)	4.23	3.67	7.06	4.99

Lead Emissions

Run No. / Sample I.D.		Total ug	grams/sample	Vmstd (cu. ft.)	Qstd (dscfm)	Mass Rate (lbs/hr)	Conc. (PPM)
	1	12.8	0.0000128	73.1301	231524	0.0054	0.0007
	12	8.5	0.0000085	68.0946	222364	0.0037	0.0005
	3	11.9	0.0000119	73.5109	243821	0.0052	0.0007
Train Blank		ND					5.3818E-07

Probe/Pitot Tube Traverse Layout Calculation Spreadsheet

Stack/duct inside diameter (inches)	156	Project:	**SunCoke - Middletown**
Required number of traverse points (stack tota	24	Test Location:	**Main Stack**
Req. traverse points on a diameter	12	Date:	**4/16/2012**
Port Length (inches)	6		
Number of Ports	4		

Location of Traverse Point (Measured from Outside Edge of Sample Port)

Traverse Point number on a diameter	2	4	6	8	10	12	14	16	18	20	22	24
1						9.28						
2						16.45						
3						24.41						
4						33.61						
5						45.00						
6						61.54						
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												

URS VELOCITY TRAVERSE DATA SHEET

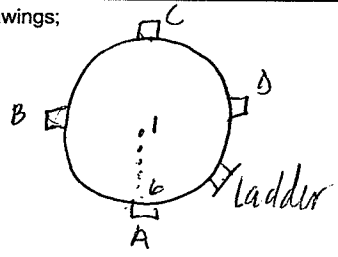
Project Name: GECC
Project No.: 39400684
Date: 5/30/12

Test No.: Prelim.
Location: Main Stack
Personnel: MM TB

	Traverse Point	Velocity Pressure	Stack Temperature	Cyclonic flow check
A	1	0.74		Ø
	2	0.76		Ø
	3	0.76		1
	4	0.75		Ø
	5	0.72		2
	6	0.60		2
B	1	0.68		Ø
	2	0.66		Ø
	3	0.65		Ø
	4	0.65		Ø
	5	0.56		3
	6	0.55		2
C	1	0.62		Ø
	2	0.62		Ø
	3	0.58		Ø
	4	0.45		2
	5	0.42		1
	6	0.42		2
D	1	0.63		Ø
	2	0.62		Ø
	3	0.62		Ø
	4	0.60		Ø
	5	0.55		3
	6	0.52		3
	Average	0.61		0.875

Start Test: 08:20
End Test: 08:35
Stack Dimensions: 156" Ø
Barometric Pressure, Pbar: 29.40 in. Hg
Static Pressure: -0.90 in. H_2O
Stack Gas, O_2: — %
Stack Gas, CO_2: — %
Stack Temperature: 253 °F
Wet Bulb Temperature: — °F
Pitot Tube Coefficient, Cp: 0.82
Pitot Positive Leak Check: ✓ > 3 in. H_2O
Pitot Negative Leak Check: ✓ > 3 in. H_2O

Notes, Drawings;



Pitot Tube Type: S I.D. No.: PS-003
Pitot Coefficient, Cp: 0.82
Manometer Type: 0-10" I.D. No.: Console 5
Thermometer Type: TC I.D. No.: PS-003

Method 5/12

Test Run 1

URS

STACK TEST DATA SHEET

TEST METHOD: M5/12

PROJECT:	GECC	BAROMETRIC (Pb):	29.50	STACK DIA.:	156"
PROJECT NO.:	39400684.000001	STATIC (Ps):	-.92	PORT LENGTH:	6"
SOURCE:	Main Stack	CONSOLE I.D.:	5	PROBE/PITOT I.D.:	6-003/PT-16
RUN I.D.:	1	DELTA H @:	1.8262	PITOT COEF.:	0.842
DATE:	5-30-12	GAMMA:	0.9639	PROBE LINER:	Glass
OPERATORS:		TEST DURATION:	120	FILTER NO.:	Q1202

TRAVERSE POINT NUMBER	SAMPLING TIME Clock	SAMPLING TIME Sample	VELOCITY ΔP	SAMPLE ΔH	GAS SAMPLE VOLUME	STACK TEMP.	PROBE TEMP.	FILTER BOX TEMP.	LAST IMPINGER TEMP.	DRY GAS METER TEMP.	TRAIN VACUUM	
1	10:48	0	0.75	1.65	57.300	323	254	250	46	70	2	
2		5	0.74	1.60	61.70	324	248	255	46	70	2	
3		10	0.78	1.70	64.90	324	256	249	50	70	2	
4		15	0.73	1.45	68.70	324	255	252	60	71	2	
5		20	0.71	1.42	71.90	320	252	251	62	71	2	
6		25	0.58	1.18	76.20	320	253	247	61	71	2	
1	11:21	30	0.68	1.38	78.710	290	257	256	57	72	2	
2		35	0.65	1.30	82.30	280	254	251	54	72	2	
3		40	0.68	1.35	85.20	306	253	251	51	72	2	
4		45	0.67	1.32	88.70	297	254	251	53	72	2	
5		50	0.60	1.20	93.00	302	255	251	54	73	2	
6		55	0.55	1.10	95.50	294	254	250	55	72	2	
1	11:57	1:00	0.62	1.25	98.385	316	257	257	56	72	2	
2		5	0.60	1.20	101.90	291	257	237	56	73	2	
3		10	0.54	1.08	104.60	285	253	250	56	72	2	
4		15	0.48	0.95	107.70	273	253	249	58	72	2	
5		20	0.40	0.80	110.90	283	254	251	61	73	2	
6		25	0.43	0.85	113.20	289	257	251	60	73	2	
1	12:20	30	0.62	1.25	115.650	286	256	251	64	73	2	
2		35	0.60	1.20	119.200	281	258	253	63	73	2	
3		40	0.60	1.20	121.80	279	259	254	65	73	2	
4		45	0.58	1.18	125.90	280	259	255	63	73	2	
5		50	0.56	1.12	128.20	282	252	249	63	73	2	
6		55	0.53	1.05	131.70	278	255	250	62	73	2	
	13:02	2:00			134.630							
AVERAGE					77.330							

PITOT LEAK CHECK (> 3")		
INITIAL	(+) ✓	(-) ✓
FINAL	(+) ✓	(-) ✓
TRAIN LEAK CHECK (ft³ @ in, Hg.)		
INITIAL	0.0 @ 15	
FINAL	@	

NOZZLE MEASUREMENT	
NOZZLE I.D.:	N5
1	0.250
2	0.250
3	0.250
Avg.	0.250

STACK GAS ANALYSIS			
	CO2	O2	
1	10.7	5.0	
2	10.7	5.2	
3	10.9	5.0	
Avg.	10.8	5.1	

NOTES: M5 in ~~[illegible]~~ leak check ~~[illegible]~~

URS

TEST LAB DATA SHEET

PROJECT:	GECC	PROJECT NO.:	39400684.00001
SOURCE:	Main Stack	TEST DATE:	5/30/2012
TRAIN I.D.	M5/12-1	TEST NO.:	1
COLLECTED BY:	MSM, TB, BJ	CHKD BY:	TG

CONDENSATION			
IMPINGER NO.	INITIAL VOL.,ml/g	FINAL VOL., ml/g	NET GAIN, ml/g
1	713.1	988.4	275.3
2	710.6	833.1	122.5
3	609.0	630.0	21.0
4	862.1	883.9	21.8
5			
6			
7			
TOTAL	2894.8	3335.4	440.6

PARTICULATE				
SAMPLE I.D. NO.		INITIAL WT., g	FINIAL WT., g	NET WT., g
PROBE WASH		8.6161	8.6215	0.0054
REAGENT BLANK		8.7418	8.7421	0.0003
CORRECTED PROBE WASH *				0.0051
FILTER # 1	Q1202	0.4634	0.4684	0.0050
FILTER # 2				
			TOTAL PARTICULATE COLLECTED	0.0101

* subtract reagent blank from probe wash

COMMENTS:

STACK TEST CALCULATIONS

Project:	GECC	Barom. Psr.:	29.5		Calculated
Project No:	39400684	Static Psr.:	-0.92	Ps:	29.432
Source:	Main Stack	Delta H @:	1.8262	As:	132.732
Run No.:	1	Gamma:	0.9639	An:	0.000341
Date:	5/30/2012	Pitot Coef.:	0.842		
Sample Volume:	77.33	Stack Dia.:	156 ,in.		
Sample Time:	120	Nozzle Dia.:	0.25 ,in.		
O2 Conc.:	5.1	H2O Gain:	440.6 ,ml		
CO2 Conc.:	10.8	Part. Weight:	0.0101 ,g		

TRAVERSE POINT NUMBER	VELOCITY DELTA P Actual	Sq. Root	DELTA H	DRY GAS METER TEMPERATURE	STACK TEMP.
1	0.75	0.866025	1.65	70	323
2	0.74	0.860233	1.60	70	324
3	0.78	0.883176	1.70	70	324
4	0.73	0.8544	1.45	71	324
5	0.71	0.842615	1.42	71	320
6	0.58	0.761577	1.18	71	320
7	0.68	0.824621	1.38	72	290
8	0.65	0.806226	1.30	72	280
9	0.68	0.824621	1.35	72	306
10	0.67	0.818535	1.32	72	297
11	0.60	0.774597	1.20	73	302
12	0.55	0.74162	1.10	72	294
13	0.62	0.787401	1.25	72	316
14	0.60	0.774597	1.20	73	291
15	0.54	0.734847	1.08	72	285
16	0.48	0.69282	0.95	72	273
17	0.40	0.632456	0.80	73	283
18	0.43	0.655744	0.85	73	289
19	0.62	0.787401	1.25	73	286
20	0.60	0.774597	1.20	73	281
21	0.60	0.774597	1.20	73	279
22	0.58	0.761577	1.18	73	280
23	0.56	0.748331	1.12	73	282
24	0.53	0.728011	1.05	73	278
AVERAGE	0.6116667	0.779609	1.24	72.04167	296.95833

URS

TEST LAB DATA SHEET

PROJECT:	GECC	PROJECT NO.:	39400559.00000
SOURCE:	Main Stack	TEST DATE:	5/30/2012
TRAIN I.D.	M5/12	TEST NO.:	1
COLLECTED BY:	MSM		

CONDENSATION

IMPINGER NO.	INITIAL VOL.,ml/g	FINAL VOL., ml/g	NET GAIN, ml/g
1	713.1	988.4	275.3
2	710.6	833.1	122.5
3	609	630.0	21.0
4	862.1	883.9	21.8
5			0
6			0
7			0
TOTAL	2894.8	3335.4	440.6

PARTICULATE

SAMPLE I.D. NO.	INITIAL WT., g	FINIAL WT., g	NET WT., g
PROBE WASH	8.6161	8.6215	0.0054
REAGENT BLANK	8.7418	8.7421	0.0003
CORRECTED PROBE WASH *			0.0051
FILTER # 1 Q1202	0.4634	0.4684	0.0050
FILTER # 2			0.0000
IMPINGERS			0.0000

* subtract reagent blank from probe wash

TOTAL PARTICULATED COLLECTED

PARTICULATE COLLECTED (excluding impinger catch)	0.0101

QA PROBE WASH (as required)

SAMPLE I.D. NO.	INITIAL WT., g	FINIAL WT., g	NET WT., g

COMMENTS:

Project: GECC
Project No: 39400684
Source: Main Stack
Run No.: 1

Stack Sampling Calculations

Volume of Water Collected

Vwstd = (Vl0)(0.04707)

Vwstd = 20.74 cubic feet

Volume of Gas Metered, Standard Conditions

Vmstd = ((17.64) (Vm)(Pb + DeltaH/13.6)(gamma))/Tm

Vmstd = 73.130 cubic feet

Moisture Content

Bwo = Vwstd/(Vmstd + Vwstd)

Bwo = 0.22

Molecular Weight of the Dry Gas Stream

Md = (.44)(%CO2) + (.32)(%O2) + (.28)(%CO +%N2)

Md = 29.9

Molecular Weight of Stack Gas

Ms = (Md(1-Bwo) + 18(bwo)

Ms = 27.3

Velocity of Stack Gas

Vs = 174 Cp (DeltaP sq.rt.)((Ts+459.6) X 29.92 X 28.96/Ps/Ms)^.5

Vs = 3,263.0 ft/min

Total Flow of Stack Gas

Qa = As X Vs

Qa = 433,108.63 ACFM

Qs = Qa X 528/Ts X Ps/29.92

Qs = 297,181.78 SCFM

Qstd = Qs(1 - Bwo)

Qstd = 231,523.71 DSCFM

Vsstd = Qstd/As

Vsstd = 1744.29 ft/min

Percent Isokinetic

Is = Vmstd/(An X Time X Vsstd)

Is = 1.02

Particulate Concentration

Cs = (15.43)(Mn)/Vmstd

Cs = 0.0021

Particulate Mass Rate

Pmr = (Mn)(Qstd)(60)/(Vmstd)(453.6)

Pmr = 4.23

Method 5/12

Test Run 2

URS

STACK TEST DATA SHEET

TEST METHOD: M5/12

PROJECT:	GECC	BAROMETRIC (Pb): 29.44	STACK DIA.:	156"	
PROJECT NO.:	39400684.000001	STATIC (Ps): -0.92	PORT LENGTH:	10"	
SOURCE:	Main Stack	CONSOLE I.D.: 5	PROBE/PITOT I.D.:	G-003 - PT-16	
RUN I.D.:	2	DELTA H @: 1.8262	PITOT COEF.:	0.842	
DATE:	5-30-12	GAMMA: 0.9639	PROBE LINER:	Glass	
OPERATORS:	MM TB BJ TG	TEST DURATION: 120	FILTER NO.:	Q1204	

TRAVERSE POINT NUMBER	SAMPLING TIME Clock	SAMPLING TIME Sample	VELOCITY ΔP	SAMPLE ΔH	GAS SAMPLE VOLUME	STACK TEMP.	PROBE TEMP.	FILTER BOX TEMP.	LAST IMPINGER TEMP.	DRY GAS METER TEMP.	TRAIN VACUUM	
1	13:55	0	0.42	0.85	135.010	280	262	255	55	71	2	
2		5	0.57	1.15	138.30	285	256	253	51	71	2	
3		10	0.56	1.15	141.00	282	253	249	48	71	2	
4		15	0.55	1.10	145.70	282	253	250	49	71	2	
5		20	0.56	1.15	147.80	283	251	249	49	71	2	
6		25	0.56	1.15	150.00	283	253	251	49	71	2	
1	14:28	30	0.50	1.00	153.50	281	255	258	54	72	2	
2		35	0.50	1.00	155.80	284	256	251	51	72	2	
3		40	0.49	0.98	159.10	284	255	251	51	73	2	
4		45	0.45	0.90	161.80	282	255	251	52	73	2	
5		50	0.39	0.78	164.10	273	253	251	52	73	2	
6		55	0.35	0.70	166.80	283	255	253	54	72	2	
1	15:02	1:00	0.58	1.15	169.20	284	256	252	54	73	2	
2		5	0.60	1.20	172.80	282	254	251	52	73	2	
3		10	0.58	1.15	175.10	284	255	250	52	73	2	
4		15	0.61	1.25	178.30	287	254	248	53	73	2	
5		20	0.55	1.10	181.70	288	254	250	55	74	2	
6		25	0.48	0.95	184.90	285	255	252	55	73	2	
1		30	0.61	1.22	187.60	289	255	254	58	73	2	
2		35	0.64	1.30	190.90	289	253	247	55	73	2	
3		40	0.64	1.30	193.90	287	254	254	57	74	2	
4		45	0.65	1.32	197.60	293	254	240	59	74	2	
5		50	0.59	1.18	200.90	290	254	256	59	74	2	
6		55	0.62	1.22	204.20	294	256	255	61	74	2	
	16:04	2:00			207.115							
AVERAGE					72.105							

PITOT LEAK CHECK (> 3")		
INITIAL	(+) ✓	(-) ✓
FINAL	(+)	(-)

TRAIN LEAK CHECK (ft^3 @ in, Hg.)	
INITIAL	0.0 @ 17
FINAL	0.0 @ 5

NOZZLE MEASUREMENT	
NOZZLE I.D.:	N5
1	0.250
2	0.250
3	0.250
Avg.	0.250

STACK GAS ANALYSIS			
	CO2	O2	
1	10.9	5.07	
2	10.5	5.7	
3	10.4	5.7	
Avg.	10.6	5.5	

NOTES:

URS

TEST LAB DATA SHEET

PROJECT:	GECC	PROJECT NO.:	39400684.00001
SOURCE:	Main Stack	TEST DATE:	5/30/12
TRAIN I.D.	M5/12-2	TEST NO.:	2
COLLECTED BY:	MSM	CHKD BY:	

CONDENSATION			
IMPINGER NO.	INITIAL VOL.,ml/g	FINAL VOL., ml/g	NET GAIN, ml/g
1	728.6	943.1	214.5
2	704.8	858.4	153.6
3	594.0	597.4	3.4
4	871.8	888.5	16.7
5			
6			
7			
TOTAL	2899.2	3287.4	388.2

PARTICULATE				
SAMPLE I.D. NO.		INITIAL WT., g	FINIAL WT., g	NET WT., g
PROBE WASH		8.7750	8.7784	0.0034
REAGENT BLANK		8.7418	8.7421	0.0003
CORRECTED PROBE WASH *				0.0031
FILTER # 1	Q1204	0.4727	0.4781	0.0054
FILTER # 2				
			TOTAL PARTICULATE COLLECTED	0.0085

* subtract reagent blank from probe wash

COMMENTS:

STACK TEST CALCULATIONS

Project:	GECC	Barom. Psr.:	29.5		Calculated
Project No:	39400684	Static Psr.:	-0.92	Ps:	29.432
Source:	Main Stack	Delta H @:	1.8262	As:	132.732
Run No.:	2	Gamma:	0.9639	An:	0.000341
Date:	5/30/2012	Pitot Coef.:	0.842		
Sample Volume:	72.105	Stack Dia.:	156	,in.	
Sample Time:	120	Nozzle Dia.:	0.25	,in.	
O2 Conc.:	5.5	H2O Gain:	388.2	,ml	
CO2 Conc.:	10.6	Part. Weight:	0.0085	,g	

TRAVERSE POINT NUMBER	VELOCITY DELTA P Actual	Sq. Root	DELTA H	DRY GAS METER TEMPERATURE	STACK TEMP.
1	0.42	0.648074	0.85	71	280
2	0.57	0.754983	1.15	71	285
3	0.56	0.748331	1.15	71	282
4	0.55	0.74162	1.10	71	282
5	0.56	0.748331	1.15	71	283
6	0.56	0.748331	1.15	71	283
7	0.50	0.707107	1.00	72	281
8	0.50	0.707107	1.00	72	284
9	0.49	0.7	0.98	73	284
10	0.45	0.67082	0.90	73	282
11	0.39	0.6245	0.78	73	273
12	0.35	0.591608	0.70	72	283
13	0.58	0.761577	1.15	73	284
14	0.60	0.774597	1.20	73	282
15	0.58	0.761577	1.15	73	284
16	0.61	0.781025	1.25	73	287
17	0.55	0.74162	1.10	74	288
18	0.48	0.69282	0.95	73	285
19	0.61	0.781025	1.22	73	289
20	0.64	0.8	1.30	73	289
21	0.64	0.8	1.30	74	287
22	0.65	0.806226	1.32	74	293
23	0.59	0.768115	1.18	74	290
24	0.62	0.787401	1.22	74	294
AVERAGE	0.54375	0.735283	1.09375	72.58333	284.75

URS

TEST LAB DATA SHEET

PROJECT:	GECC	PROJECT NO.:	39400559.00000
SOURCE:	Main Stack	TEST DATE:	7/14/2010
TRAIN I.D.	M5/12	TEST NO.:	2
COLLECTED BY:	MSM		

CONDENSATION

IMPINGER NO.	INITIAL VOL.,ml/g	FINAL VOL., ml/g	NET GAIN, ml/g
1	728.6	943.1	214.5
2	704.8	858.4	153.6
3	594.0	597.4	3.4
4	871.8	888.5	16.7
5			0.0
6			0.0
7			0.0
TOTAL	2899.2	3287.4	388.2

PARTICULATE

SAMPLE I.D. NO.	INITIAL WT., g	FINIAL WT., g	NET WT., g
PROBE WASH	8.7750	8.7784	0.0034
REAGENT BLANK	8.7418	8.7421	0.0003
CORRECTED PROBE WASH *			0.0031
FILTER # 1 Q1204	0.4727	0.4781	0.0054
FILTER # 2			0.0000
IMPINGERS			0.0000

* subtract reagent blank from probe wash

TOTAL PARTICULATED COLLECTED

PARTICULATE COLLECTED (excluding impinger catch)	0.0085

QA PROBE WASH (as required)

SAMPLE I.D. NO.	INITIAL WT., g	FINIAL WT., g	NET WT., g

COMMENTS:

Project: GECC
Project No: 39400684
Source: Main Stack
Run No.: 2

Stack Sampling Calculations

Volume of Water Collected

Vwstd = (VI0)(0.04707)

Vwstd = 18.27 cubic feet

Volume of Gas Metered, Standard Conditions

Vmstd = ((17.64) (Vm)(Pb + DeltaH/13.6)(gamma))/Tm

Vmstd = 68.095 cubic feet

Moisture Content

Bwo = Vwstd/(Vmstd + Vwstd)

Bwo = 0.21

Molecular Weight of the Dry Gas Stream

Md = (.44)(%CO2) + (.32)(%O2) + (.28)(%CO +%N2)

Md = 29.9

Molecular Weight of Stack Gas

Ms = (Md(1-Bwo) + 18(bwo)

Ms = 27.4

Velocity of Stack Gas

Vs = 174 Cp (DeltaP sq.rt.)((Ts+459.6) X 29.92 X 28.96/Ps/Ms)^.5

Vs = 3,046.8 ft/min

Total Flow of Stack Gas

Qa = As X Vs

Qa = 404,401.82 ACFM

Qs = Qa X 528/Ts X Ps/29.92

Qs = 282,032.99 SCFM

Qstd = Qs(1 - Bwo)

Qstd = 222,363.70 DSCFM

Vsstd = Qstd/As

Vsstd = 1675.28 ft/min

Percent Isokinetic

Is = Vmstd/(An X Time X Vsstd)

Is = 0.99

Particulate Concentration

Cs = (15.43)(Mn)/Vmstd

Cs = 0.0019

Particulate Mass Rate

Pmr = (Mn)(Qstd)(60)/(Vmstd)(453.6)

Pmr = 3.67

Method 5/12

Test Run 3

URS

STACK TEST DATA SHEET

TEST METHOD: M5/12

PROJECT:	GECC	BAROMETRIC (Pb):	29.50	STACK DIA.:	156"
PROJECT NO.:	39400684.000001	STATIC (Ps):	-0.92	PORT LENGTH:	6"
SOURCE:	Main Stack	CONSOLE I.D.:	5	PROBE/PITOT I.D.:	6-003/ PT-16
RUN I.D.:	3	DELTA H @:	1.8262	PITOT COEF.:	0.842
DATE:	5-30-12	GAMMA:	0.9639	PROBE LINER:	Glass
OPERATORS:	MM TG BJ TB	TEST DURATION:	120	FILTER NO.:	Q1205

TRAVERSE POINT NUMBER	SAMPLING TIME Clock	SAMPLING TIME Sample	VELOCITY ΔP	SAMPLE ΔH	GAS SAMPLE VOLUME	STACK TEMP.	PROBE TEMP.	FILTER BOX TEMP.	LAST IMPINGER TEMP.	DRY GAS METER TEMP.	TRAIN VACUUM	
1	19:02	0	0.63	1.25	207.300	~~265~~	254	251	57	70	2	
2		5	0.65	1.30	210.80	~~267~~	255	246	53	71	2	
3		10	0.67	1.35	213.90	~~269~~	253	255	53	71	2	
4		15	0.68	1.38	218.50	~~265~~	251	249	53	71	2	
5		20	0.68	1.38	221.00	258	254	256	57	71	2	
6		25	0.61	1.22	224.30	259	254	253	57	72	2	
1		30	0.55	1.10	228.40	261	258	262	61	72	2	
2		35	0.63	1.25	231.00	262	255	250	56	72	2	
3		40	0.65	1.30	233.70	262	255	251	56	73	2	
4		45	0.62	1.22	237.20	263	254	250	58	73	2	
5		50	0.60	1.20	240.70	262	254	250	60	72	2	
6		55	0.53	1.05	244.10	262	253	251	61	73	2	
1		1:00	0.59	1.18	246.55	262	255	250	61	73	2	
2		5	0.60	1.20	249.70	261	253	254	58	73	2	
3		10	0.58	1.18	253.40	263	256	251	57	73	2	
4		15	0.54	1.10	256.00	262	253	253	58	73	2	
5		20	0.52	1.05	259.20	263	252	252	59	73	2	
6		25	0.52	1.05	262.40	263	256	249	59	73	2	
1	①	30	0.70	1.40	265.20	258	254	250	56	73	2	
2	②	35	0.68	1.38	268.30	258	253	247	53	73	2	
3		40	0.65	1.30	271.90	259	255	251	55	73	2	
4		45	0.68	1.38	275.50	260	254	254	57	74	2	
5		50	0.65	1.30	279.10	261	254	256	60	74	2	
6		55	0.62	1.22	282.20	261	253	250	61	74	2	
	23:58	2:00			285.100							
AVERAGE					77.8							

PITOT LEAK CHECK (> 3")		
INITIAL	(+) ✓	(-) ✓
FINAL	(+) ✓	(-) ✓
TRAIN LEAK CHECK (ft^3 @ in, Hg.)		
INITIAL	0.0	@ 15
FINAL	0.0	@ 5

NOZZLE MEASUREMENT	
NOZZLE I.D.:	N5
1	0.250
2	0.250
3	0.250
Avg.	0.250

STACK GAS ANALYSIS			
	CO2	O2	
1	9.5	7.0	
2	9.0	7.9	
3	9.2	7.6	
Avg.	9.2	7.5	

NOTES: ① Test stopped due to hot car problem @ 20:40

② 23:27 restart test

URS

TEST LAB DATA SHEET

PROJECT:	GECC	PROJECT NO.:	39400684.00001
SOURCE:	Main Stack	TEST DATE:	5/30/12
TRAIN I.D.	M5/12-3	TEST NO.:	3
COLLECTED BY:	MSM	CHKD BY:	

CONDENSATION			
IMPINGER NO.	INITIAL VOL.,ml/g	FINAL VOL., ml/g	NET GAIN, ml/g
1	733.6	915.3	181.7
2	702.9	886.6	183.7
3	615.7	628.5	12.8
4	906.3	926.6	20.3
5			
6			
7			
TOTAL	2958.5	3357.0	398.5

PARTICULATE				
SAMPLE I.D. NO.		INITIAL WT., g	FINIAL WT., g	NET WT., g
PROBE WASH		8.7622	8.7666	0.0044
REAGENT BLANK		8.7418	8.7421	0.0003
CORRECTED PROBE WASH *				0.0041
FILTER # 1	Q1205	0.4580	0.4700	0.0120
~~FILTER # 2~~				
			TOTAL PARTICULATE COLLECTED	0.0161

* subtract reagent blank from probe wash

COMMENTS:

STACK TEST CALCULATIONS

Project:	GECC	Barom. Psr.:	29.5		Calculated
Project No:	39400684	Static Psr.:	-0.92	Ps:	29.432
Source:	Main Stack	Delta H @:	1.8262	As:	132.732
Run No.:	3	Gamma:	0.9639	An:	0.000341
Date:	5/30/2012	Pitot Coef.:	0.842		
Sample Volume:	77.800	Stack Dia.:	156	,in.	
Sample Time:	120	Nozzle Dia.:	0.25	,in.	
O2 Conc.:	7.5	H2O Gain:	398.5	,ml	
CO2 Conc.:	9.2	Part. Weight:	0.0161	,g	

TRAVERSE POINT NUMBER	VELOCITY DELTA P		DELTA H	DRY GAS METER TEMPERATURE	STACK TEMP.
	Actual	Sq. Root			
1	0.63	0.793725	1.25	70	265
2	0.65	0.806226	1.30	71	267
3	0.67	0.818535	1.35	71	269
4	0.68	0.824621	1.38	71	265
5	0.68	0.824621	1.38	71	258
6	0.61	0.781025	1.22	72	259
7	0.55	0.74162	1.10	72	261
8	0.63	0.793725	1.25	72	262
9	0.65	0.806226	1.30	73	262
10	0.62	0.787401	1.22	73	263
11	0.60	0.774597	1.20	72	262
12	0.53	0.728011	1.05	73	262
13	0.59	0.768115	1.18	73	262
14	0.60	0.774597	1.20	73	261
15	0.58	0.761577	1.18	73	263
16	0.54	0.734847	1.10	73	262
17	0.52	0.72111	1.05	73	263
18	0.52	0.72111	1.05	73	263
19	0.70	0.83666	1.40	73	258
20	0.68	0.824621	1.38	73	258
21	0.65	0.806226	1.30	73	259
22	0.68	0.824621	1.38	74	260
23	0.65	0.806226	1.30	74	261
24	0.62	0.787401	1.22	74	261
AVERAGE	0.6179167	0.78531	1.24	72.5	261.9167

URS

TEST LAB DATA SHEET

PROJECT:	GECC	PROJECT NO.:	39400559.00000
SOURCE:	Main Stack	TEST DATE:	5/30/2012
TRAIN I.D.	M5/12	TEST NO.:	3
COLLECTED BY:	MSM		

CONDENSATION

IMPINGER NO.	INITIAL VOL.,ml/g	FINAL VOL., ml/g	NET GAIN, ml/g
1	733.6	915.3	181.7
2	702.9	886.6	183.7
3	615.7	628.5	12.8
4	906.3	926.6	20.3
5			0.0
6			0.0
7			0.0
TOTAL	2958.5	3357	398.5

PARTICULATE

SAMPLE I.D. NO.	INITIAL WT., g	FINIAL WT., g	NET WT., g
PROBE WASH	8.7622	8.7666	0.0044
REAGENT BLANK	8.7418	8.7421	0.0003
CORRECTED PROBE WASH *			0.0041
FILTER # 1 Q1205	0.4580	0.4700	0.0120
FILTER # 2			0.0000
IMPINGERS			0.0000

* subtract reagent blank from probe wash

TOTAL PARTICULATED COLLECTED

PARTICULATE COLLECTED (excluding impinger catch)	0.0161

QA PROBE WASH (as required)

SAMPLE I.D. NO.	INITIAL WT., g	FINIAL WT., g	NET WT., g

COMMENTS:

Project: GECC
Project No: 39400684
Source: Main Stack
Run No.: 3

Stack Sampling Calculations

Volume of Water Collected

Vwstd = (VI0)(0.04707)

Vwstd = 18.76 cubic feet

Volume of Gas Metered, Standard Conditions

Vmstd = ((17.64) (Vm)(Pb + DeltaH/13.6)(gamma))/Tm

Vmstd = 73.511 cubic feet

Moisture Content

Bwo = Vwstd/(Vmstd + Vwstd)

Bwo = 0.20

Molecular Weight of the Dry Gas Stream

Md = (.44)(%CO2) + (.32)(%O2) + (.28)(%CO +%N2)

Md = 29.8

Molecular Weight of Stack Gas

Ms = (Md(1-Bwo) + 18(bwo)

Ms = 27.4

Velocity of Stack Gas

Vs = 174 Cp (DeltaP sq.rt.)((Ts+459.6) X 29.92 X 28.96/Ps/Ms)^.5

Vs = 3,204.7 ft/min

Total Flow of Stack Gas

Qa = As X Vs

Qa = 425,365.19 ACFM

Qs = Qa X 528/Ts X Ps/29.92

Qs = 306,035.77 SCFM

Qstd = Qs(1 - Bwo)

Qstd = 243,821.20 DSCFM

Vsstd = Qstd/As

Vsstd = 1836.94 ft/min

Percent Isokinetic

Is = Vmstd/(An X Time X Vsstd)

Is = 0.98

Particulate Concentration

Cs = (15.43)(Mn)/Vmstd

Cs = 0.0034

Particulate Mass Rate

Pmr = (Mn)(Qstd)(60)/(Vmstd)(453.6)

Pmr = 7.06

Method 12

Lab Report

SAMPLE SUMMARY

H2F060453

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
MT1L6	001	GECC M12 RUN 1	05/21/12	
MT1L7	002	GECC M12 RUN 2	05/21/12	
MT1L9	003	GECC M12 RUN 3	05/22/12	
MT1MA	004	GECC M12 BLANK	05/21/12	

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

URS Corporation

Client Sample ID: GECC M12 RUN 1

TOTAL Metals

Lot-Sample #...: H2F060453-001 **Matrix.....:** AIR
Date Sampled...: 05/21/12 **Date Received..:** 06/06/12

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2163020						
Lead	12.8	**1.0**	**ug**	**CFR60A 12**	**06/11-06/15/12**	**MT1L61AA**
		Dilution Factor: 1		Analysis Time..: 12:16	MDL.....: 0.35	

URS Corporation

Client Sample ID: GECC M12 RUN 2

TOTAL Metals

Lot-Sample #...: H2F060453-002 **Matrix.....:** AIR
Date Sampled...: 05/21/12 **Date Received..:** 06/06/12

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2163020						
Lead	**8.5**	**1.0**	**ug**	**CFR60A 12**	**06/11-06/15/12**	**MT1L71AA**
		Dilution Factor: 1		Analysis Time..: 12:21	MDL.....: 0.35	

URS Corporation

Client Sample ID: GECC M12 RUN 3

TOTAL Metals

Lot-Sample #...: H2F060453-003 **Matrix.....:** AIR
Date Sampled...: 05/22/12 **Date Received..:** 06/06/12

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2163020						
Lead	**11.9**	**1.0**	**ug**	**CFR60A 12**	**06/11-06/15/12**	**MT1L91AA**
		Dilution Factor: 1		Analysis Time..: 12:35	MDL.....: 0.35	

URS Corporation

Client Sample ID: GECC M12 BLANK

TOTAL Metals

Lot-Sample #...: H2F060453-004 **Matrix.....:** AIR
Date Sampled...: 05/21/12 **Date Received..:** 06/06/12

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 2163020						
Lead	ND	1.0	ug	CFR60A 12	06/11-06/15/12	MT1MA1AA
		Dilution Factor: 1		Analysis Time..: 12:40	MDL.....: 0.35	

METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: H2F060453 **Matrix.....:** AIR

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: H2F110000-020 **Prep Batch #...:** 2163020						
Lead	ND	1.0	ug	CFR60A 12	06/11-06/15/12	MT24P1AA
		Dilution Factor: 1				
		Analysis Time..: 12:01				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

Lot-Sample #...: H2F060453 **Matrix.....:** AIR

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP-BATCH #
Lead	100	(80 - 120)			CFR60A 12	06/11-06/15/12	2163020
	103	(80 - 120)	2.4	(0-20)	CFR60A 12	06/11-06/15/12	2163020

Dilution Factor: 1 Analysis Time..: 12:06

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE DATA REPORT

TOTAL Metals

Lot-Sample #...: H2F060453 **Matrix.....:** AIR

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Lead	10.0	10.0	ug	100		CFR60A 12	06/11-06/15/12	2163020
	10.0	10.3	ug	103	2.4	CFR60A 12	06/11-06/15/12	2163020

Dilution Factor: 1 Analysis Time..: 12:06

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

TestAmerica Knoxville

ICP Data Reporting Form

Post Digestion Spike

Units: ug/L (ppb)

Instrument ID: Thermo iCAP 6500 Duo ICP

Data File Name: F061512.arc

Element	PDS MT1L7A	Original Sample MT1L7	Spike Added	Percent Recovery
Pb	175.25	84.63	100.0	90.6

TestAmerica Knoxville

ICP Data Reporting Form

Post Digestion Spike

Units: ug/L (ppb)

Instrument ID: Thermo iCAP 6500 Duo ICP

Data File Name: F061512.arc

Element	PDS MT1L7A	Original Sample MT1L7	Spike Added	Percent Recovery
Pb	175.10	84.63	100.0	90.5

EPA METHOD 201/202

URS

SUMMARY OF RESULTS	
Project Name:	Gateway Energy
Project Number:	39400559.00001
Site Location:	Granite City
Test Location:	Main Stack
Test Train:	PM10/2.5

Parameters	Run # 1	Run # 2	Run # 3	Average
Run Times	10:48 - 13:25	13:55 - 16:04	19:02 - 24:00	
Date	5/30/2012	5/30/2012	5/30/2012	
Sample Time	119.7	117.5	123.4	120.2
Vol. Sampled @ STP (ft3)	40.399	41.666	42.083	41.383
Moisture Content (% Vol.)	19.9	21.2	20.4	20.5
O2 (%)	5.1	5.4	7.5	6.0
CO2 (%)	10.8	10.7	9.2	10.2
Stack Gas Temperature (°F)	298	283	256	279
Stack Velocity (ft/min.)	3,304	3,168	3,270	3,247
Stack Velocity (ft/sec.)	55.07	52.81	54.50	54.12
Gas Flow Rate (ACFM)	438,543	420,548	434,026	431,039
Gas Flow Rate (SCFM)	300,679	294,001	314,774	303,151
Gas Flow Rate (DSCFM)	240,917	231,745	250,589	241,084
Percent Isokinetic	104.1	113.7	101.1	106.3
Condensable Particulate Matter (CPM)				
CPM Conc. (Grains/DSCF)	0.0027	0.0036	0.0025	0.0029
CPM Mass Rate (pounds/hr)	5.68	7.14	5.28	6.03
PM_{10} Filterable Emissions (Includes $PM_{2.5}$ and CPM)				
PM_{10} Conc. (grains/dscf)	0.0035	0.0043	0.0032	0.0037
PM_{10} Emission Rate (lbs/hr)	7.26	8.53	6.77	7.52
$PM_{2.5}$ Filterable Emissions				
$PM_{2.5}$ Conc. (grains/dscf)	0.0031	0.0038	0.0027	0.0032
$PM_{2.5}$ Emission Rate (lbs/hr)	6.31	7.58	5.91	6.60

Project: GECC
Project No.: 39400684
Source: Main Stack
Test Date: 5/30/2012
Test I.D. **CPM**

Parameters	Run # 1	Run # 2	Run # 3	Average
Sample Time	119.7	117.5	123.4	120.2
Vol. Sampled @ STP (ft3)	40.399	41.666	42.083	41.383
Moisture Content (% Vol.)	19.9	21.2	20.4	20.5
O2 (%)	5.1	5.4	7.5	6.0
CO2 (%)	10.8	10.7	9.2	10.2
Stack Gas Temperature (°F)	298	283	256	279
Stack Velocity (ft/min.)	3,304	3,168	3,270	3,247
Gas Flow Rate (ACFM)	438,543	420,548	434,026	431,039
Gas Flow Rate (SCFM)	300,679	294,001	314,774	303,151
Gas Flow Rate (DSCFM)	240,917	231,745	250,589	241,084
Percent Isokinetic	104.1	113.7	101.1	106.3
Particulate Conc. (Grains/DSCF)	0.0027	0.0036	0.0025	0.0029
Particulate Conc. (MG/DSCM)	6.2930	8.2201	5.6216	6.7115
Particulate Mass Rate (pounds/hr)	5.68	7.14	5.28	6.03

Project: GECC
Project No.: 39400684
Source: Main Stack
Test Date: 5/30/2012
Test I.D. **PM2.5**

Parameters	Run # 1	Run # 2	Run # 3	Average
Sample Time	119.7	117.5	123.4	120.2
Vol. Sampled @ STP (ft3)	40.399	41.666	42.083	41.383
Moisture Content (% Vol.)	19.9	21.2	20.4	20.5
O2 (%)	5.1	5.4	7.5	6.0
CO2 (%)	10.8	10.7	9.2	10.2
Stack Gas Temperature (°F)	298	283	256	279
Stack Velocity (ft/min.)	3,304	3,168	3,270	3,247
Gas Flow Rate (ACFM)	438,543	420,548	434,026	431,039
Gas Flow Rate (SCFM)	300,679	294,001	314,774	303,151
Gas Flow Rate (DSCFM)	240,917	231,745	250,589	241,084
Percent Isokinetic	104.1	113.7	101.1	106.3
Particulate Conc. (Grains/DSCF)	0.0003	0.0002	0.0003	0.0003
Particulate Conc. (MG/DSCM)	0.6992	0.5085	0.6712	0.6263
Particulate Mass Rate (pounds/hr)	0.63	0.44	0.63	0.57

Project: GECC
Project No.: 39400684
Source: Main Stack
Test Date: 5/30/2012
Test I.D. **PM10**

Parameters	Run # 1	Run # 2	Run # 3	Average
Sample Time	119.7	117.5	123.4	120.2
Vol. Sampled @ STP (ft3)	40.399	41.666	42.083	41.383
Moisture Content (% Vol.)	19.9	21.2	20.4	20.5
O2 (%)	5.1	5.4	7.5	6.0
CO2 (%)	10.8	10.7	9.2	10.2
Stack Gas Temperature (°F)	298	283	256	279
Stack Velocity (ft/min.)	3,304	3,168	3,270	3,247
Gas Flow Rate (ACFM)	438,543	420,548	434,026	431,039
Gas Flow Rate (SCFM)	300,679	294,001	314,774	303,151
Gas Flow Rate (DSCFM)	240,917	231,745	250,589	241,084
Percent Isokinetic	104.1	113.7	101.1	106.3
Particulate Conc. (Grains/DSCF)	0.0005	0.0005	0.0004	0.0004
Particulate Conc. (MG/DSCM)	1.0488	1.1017	0.9229	1.0245
Particulate Mass Rate (pounds/hr)	0.95	0.96	0.87	0.92

Method 201/202

Test Run 1

URS **STACK TEST DATA SHEET** TEST METHOD: M201/202

PROJECT:	GECC	BAROMETRIC (Pb):	29.50	STACK DIA.:	156"
PROJECT NO.:	39400684.00001	STATIC (Ps):	-0.92	PORT LENGTH:	6"
SOURCE:	Main Stack	CONSOLE I.D.:	2	PROBE/PITOT I.D.:	6-004/PT-6
RUN I.D.:	1	DELTA H @:	1.8345	PITOT COEF.:	0.842
DATE:	5-30-12	GAMMA:	0.9946	PROBE LINER:	glass
OPERATORS:	MM TG BJ	TEST DURATION:	120	FILTER NO.:	47-189

TRAVERSE POINT NUMBER	SAMPLING TIME Clock	SAMPLING TIME Sample	VELOCITY ΔP	SAMPLE ΔH	GAS SAMPLE VOLUME	STACK TEMP.	PROBE TEMP.	FILTER BOX TEMP.	LAST IMPINGER TEMP.	DRY GAS METER TEMP.	TRAIN VACUUM	#2 Filter
1	10:48	0	0.65	0.42	383.655	323	260	245	55	69	2	70
2		5.1	0.68	0.42	385.50	324	260	245	54	69	2	68
3		10.3	0.71	0.42	387.40	324	260	245	55	69	2	72
4		15.6	0.71	0.42	389.20	324	259	249	56	69	2	71
5		20.8	0.68	0.42	391.30	324	259	245	60	69	2	75
6		26.0	0.62	0.42	392.90	320	254	252	63	70	2	82
7	11:21	31.0	0.68	0.42	394.66	290	253	244	45	70	2	78
8		36.2	0.68	0.42	396.70	280	253	244	48	70	2	80
9		41.4	0.71	0.42	398.70	306	253	250	59	70	2	80
10		46.6	0.70	0.42	400.10	297	253	240	49	70	2	78
11		51.9	0.74	0.42	401.90	302	253	245	47	71	2	76
12		57.3	0.72	0.42	403.90	294	257	245	50	71	2	78
13	11:57	62.7	0.68	0.42	405.28	316	260	249	62	70	2	76
14		67.8	0.68	0.42	407.10	291	250	245	53	70	2	77
15		73.0	0.70	0.42	409.00	285	246	245	59	70	2	78
16		78.3	0.66	0.42	410.50	273	250	244	48	72	2	77
17		83.4	0.56	0.42	412.50	283	249	246	50	72	2	80
18		88.1	0.55	0.42	414.20	289	249	245	50	71	2	80
19	12:20	92.8	0.62	0.42	415.65	288	250	245	51	71	8	80
20	①	97.7	0.60	0.42	416.50	286	250	242	51	70	10	79
21		102.6	0.54	0.42	417.00	281	250	241	51	70	11	79
22		107.2	0.48	0.42	419.50	282	248	242	52	71	12	78
23		111.6	0.40	0.42	421.50	282	247	241	52	71	13	78
24		115.5	0.43	0.42	423.00	277	249	245	52	71	5	63
	13:25	119.7			425.500							
					41.845							
					-0.500 - mid leak check							
AVERAGE					41.345							

PITOT LEAK CHECK (> 3")		
INITIAL	(+) ✓	(-) ✓
FINAL	(+) ✓	(-) ✓
TRAIN LEAK CHECK (ft^3 @ in, Hg.)		
INITIAL	0.0 @ 15"	
FINAL	0.0 @ 17"	

NOZZLE MEASUREMENT	
NOZZLE I.D.:	N3
1	0.181
2	0.181
3	0.181
Avg.	0.181

STACK GAS ANALYSIS			
	CO2	O2	
1	10.7	5.0	
2	10.7	5.2	
3	10.9	5.0	
Avg.	10.8	5.1	

NOTES: 12:25 ① stopped at 416.500 due to low sample flow - high vacuum. #2 Filter was saturated. Performed leak check before/after train check.
12:47 Restarted at 417.000 - Subtract 0.500 from sample total.

URS

IMPINGER LAB SHEET

Test Method: 201/202

PROJECT: GECC JOB NO.: 39400684.00001

SOURCE: Main Stack DATE: 5/30/12

TRAIN I.D.: 201/202 - 1 TEST NO.: 1

COLLECTED BY: MSM

IMPINGER WEIGHTS

IMPINGER NO.	INITIAL VOL., ml/g	FINAL VOL., ml/g	NET GAIN, ml/g
1	356.8	357.9	275.3
2	602.1	755.4	122.5
3	731.0	709.6	21.0
4	892.0	911.9	21.8
5			
6			
7			
TOTAL	2581.9	2794.8	212.9

CALIBRATION WEIGHT

CALIBRATED VALUE, g	MEASURED VALUE, g	DIFFERENCE, g
500	500.1	0.1

NOTES: _____

GECC Main Stack
Run - 1

EPA Method 201A: PM10 Sampling Using a Constant-Rate Cyclone
Pretest Calculations for Sampling Rate and Nozzle Size

Calculation of Cyclone Sampling Rate					
Data Entry	Symbol	Units	Run 1	Run 2	Run 3
Standard Temperature	Tstd	deg F	68.0		
Standard Pressure	Pstd	in. Hg	29.92		
Pitot Coefficient	Cp	--	0.84		
Meter Coefficient	Yi	--	0.9946		
Meter dH@	dH@	in. H2O	1.8345		
Barometric Pressure	Pbar	in. Hg	29.50		
Stack Static Pressure	Pg	in. WC	-0.92		
Stack Temperature	Ts	deg. F	**297.0**	**247.0**	**347.0**
Meter Temperature	Tm	deg. F	70.0		
Stack Gas Characteristics					
Moisture Content	Bws	--	0.17		
Oxygen Content	%O2	%	5.0		
Carbon Dioxide Content	%CO2	%	10.7		
Calculations	Symbol	Units	Run 1	Run 2	Run 3
Abs. Meter Temperature	Tma	deg. R	530.0	530.0	530.0
Stack Parameters					
Abs. Stack Pressure	Ps	in. Hg	29.43		
Abs. Stack Temperature	Tsa	deg. R	757.0	707.0	807.0
MW, Dry	Md	lb/lb-mol	29.91		
MW, Wet	Mw	lb/lb-mol	27.89		
Viscosity	mu	micropoise	221.12	207.48	234.92
Target Flow Rate, Cyclone	Qs	ACFM	0.613	0.563	0.663
Target dH for Qs	dH	in. H2O	0.42	0.40	0.43

Calculation of Cyclone Nozzle Sizes				
Nozzle Selection	Symbol	Units	Calculated for Run 1 Data	
Abs. Meter Temperature	Tma	deg. R	530.0	
Stack Parameters				
Abs. Stack Pressure	Ps	in. Hg	29.43	
Abs. Stack Temperature	Tsa	deg. R	*757.0*	** Reference above CELL*
MW, Wet	Mw	lb/lb-mol	27.89	
Viscosity	mu	mpoise	*221.12*	*Check value*
Pitot Coefficient	Cp	--	0.84	
Target Flow Rate, Cyclone	Qs	ACFM	*0.613*	*Check value*

** Enter appropriate value by typing "=" and clicking on desired CELL.*

Calculations	Symbol	Units	Calculated for Run 1 Data			
Target Flow Rate, Cyclone	Qs	ACFM	**0.613**			
Nozzle ID No.	No.	--	NA	NA	NA	
Nozzle Diameter	Dn	in.	**0.181**	**0.215**	**0.197**	From M201A Fig 2
Nozzle Velocity	Vn	fps	57.14	40.50	48.23	
Min. Velocity	Vmin.	fps	39.78	24.68	31.90	
Rmin.	Rmin.	--	0.6961	0.6096	0.6613	
Max. Velocity	Vmax	fps	72.35	52.97	61.95	
Rmax.	Rmax	--	1.2662	1.3081	1.2844	
Min. Velocity Head	dPmin	in. WC	0.333	0.128	0.214	
Max. Velocity Head	dPmax	in. WC	1.101	0.590	0.807	
		Mean DP	0.7167939	0.359146	0.5105687	Pick closest to average during prelim

GECC Main Stack
Run - 1

EPA Method 201A: PM10 Sampling Using a Constant-Rate Cyclone
Variation of Dwell Time v. Differential Pressure

Data Entry	Symbol	Units	Run 1
Average DP (from previous test)	DP(avg)	in. WC	0.63
Total Run Time	t,total	min	120
Number of Traverse Points	n	--	24
Average Time per Traverse Point	t,avg	min	5

Change this Cell to avg

Calculation of Dwell Time Factor

use this column for DP observed during the run

ti = t,avg * (DPi÷dp,avg)^0.5

	DP @ Pt DPi	Dwell Factor Ki	Est. Time ti				
	0.65	1.01	5.1	1	5.1		
	0.68	1.04	5.2	2	5.2	10.3	
	0.71	1.06	5.3	3	5.3	15.6	
	0.71	1.06	5.3	4	5.3	20.8	
	0.68	1.04	5.2	5	5.2	26.0	
	0.62	0.99	5.0	6	5.0	31.0	
	0.68	1.04	5.2	7	5.2	36.2	
	0.68	1.04	5.2	8	5.2	41.4	
	0.71	1.06	5.3	9	5.3	46.6	
	0.7	1.05	5.3	10	5.3	51.9	
	0.74	1.08	5.4	11	5.4	57.3	
	0.72	1.07	5.3	12	5.3	62.7	
	0.68	1.04	5.2	1	5.2	67.8	5
	0.68	1.04	5.2	2	5.2	73.0	10.2
	0.7	1.05	5.3	3	5.3	78.3	15.4
	0.66	1.02	5.1	4	5.1	83.4	20.6
	0.56	0.94	4.7	5	4.7	88.1	25.3
	0.55	0.93	4.7	6	4.7	92.8	29.9
	0.62	0.99	5.0	7	5.0	97.7	34.9
	0.6	0.97	4.9	8	4.9	102.6	39.7
	0.54	0.92	4.6	9	4.6	107.2	44.4
	0.48	0.87	4.4	10	4.4	111.6	48.7
	0.4	0.80	4.0	11	4.0	115.5	52.7
	0.43	0.82	4.1	12	4.1	119.7	56.8

119.7 Total minutes

dp	temp
0.65 0.68 0.71	260
0.71 0.68 0.62	
0.68 0.68 0.71	
0.7 0.74 0.72	
0.68 0.68 0.7	
0.66 0.56 0.55	
0.62 0.6 0.54	
0.48 0.4 0.43	
0.6325	260

STACK TEST CALCULATIONS

Project:	GECC	Barom. Psr.:	29.5		Calculated
Project No:	39400684	Static Psr.:	-0.92	Ps:	29.432
Source:	Main Stack	Delta H @:	1.8345	As:	132.732
Run No.:	1	Gamma:	0.9946	An:	0.000179
Date:	5/30/2012	Pitot Coef.:	0.842		
Sample Volume:	41.345	Stack Dia.:	156	,in.	
Sample Time:	119.7	Nozzle Dia.:	0.181	,in.	
O2 Conc.:	5.1	H2O Gain:	212.9	,ml	
CO2 Conc.:	10.8	Part. Weight:	0.0072	,g	

CPM

TRAVERSE POINT NUMBER	VELOCITY DELTA P Actual	Sq. Root	DELTA H	DRY GAS METER TEMPERATURE	STACK TEMP.
1	0.65	0.806226	0.42	69	323
2	0.68	0.824621	0.42	69	324
3	0.71	0.842615	0.42	69	324
4	0.71	0.842615	0.42	69	324
5	0.68	0.824621	0.42	69	324
6	0.62	0.787401	0.42	70	320
7	0.68	0.824621	0.42	70	290
8	0.68	0.824621	0.42	70	280
9	0.71	0.842615	0.42	70	306
10	0.70	0.83666	0.42	70	297
11	0.74	0.860233	0.42	71	302
12	0.72	0.848528	0.42	71	294
13	0.68	0.824621	0.42	70	316
14	0.68	0.824621	0.42	70	291
15	0.70	0.83666	0.42	70	285
16	0.66	0.812404	0.42	72	273
17	0.56	0.748331	0.42	72	283
18	0.55	0.74162	0.42	71	289
19	0.62	0.787401	0.42	71	288
20	0.60	0.774597	0.42	70	286
21	0.54	0.734847	0.42	70	281
22	0.48	0.69282	0.42	71	282
23	0.40	0.632456	0.42	71	282
24	0.43	0.655744	0.42	71	277
AVERAGE	0.6325	0.792979	0.42	70.25	297.54167

Project: GECC
Project No: 39400684
Source: Main Stack
Run No.: 1 **CPM**

Stack Sampling Calculations

Volume of Water Collected

Vwstd = (Vl0)(0.04707)

Vwstd = 10.02 cubic feet

Volume of Gas Metered, Standard Conditions

Vmstd = ((17.64) (Vm)(Pb + DeltaH/13.6)(gamma))/Tm

Vmstd = 40.399 cubic feet

Moisture Content

Bwo = Vwstd/(Vmstd + Vwstd)

Bwo = 0.20

Molecular Weight of the Dry Gas Stream

Md = (.44)(%CO2) + (.32)(%O2) + (.28)(%CO +%N2)

Md = 29.9

Molecular Weight of Stack Gas

Ms = (Md(1-Bwo) + 18(bwo)

Ms = 27.6

Velocity of Stack Gas

Vs = 174 Cp (DeltaP sq.rt.)((Ts+459.6) X 29.92 X 28.96/Ps/Ms)^.5

Vs = 3,304.0 ft/min

Total Flow of Stack Gas

Qa = As X Vs

Qa = 438,543.12 ACFM

Qs = Qa X 528/Ts X Ps/29.92

Qs = 300,679.00 SCFM

Qstd = Qs(1 - Bwo)

Qstd = 240,917.39 DSCFM

Vsstd = Qstd/As

Vsstd = 1815.06 ft/min

Percent Isokinetic

Is = Vmstd/(An X Time X Vsstd)

Is = 1.04

Particulate Concentration

Cs = (15.43)(Mn)/Vmstd

Cs = 0.0027

Particulate Mass Rate

Pmr = (Mn)(Qstd)(60)/(Vmstd)(453.6)

Pmr = 5.68

STACK TEST CALCULATIONS

Project:	GECC	Barom. Psr.:	29.5		Calculated
Project No:	39400684	Static Psr.:	-0.92	Ps:	29.432
Source:	Main Stack	Delta H @:	1.8345	As:	132.732
Run No.:	1	Gamma:	0.9946	An:	0.000179
Date:	5/30/2012	Pitot Coef.:	0.842		
Sample Volume:	41.345	Stack Dia.:	156	,in.	
Sample Time:	119.7	Nozzle Dia.:	0.181	,in.	
O2 Conc.:	5.1	H2O Gain:	212.9	,ml	
CO2 Conc.:	10.8	Part. Weight:	0.0008	,g	

PM2.5

TRAVERSE POINT NUMBER	VELOCITY DELTA P Actual	Sq. Root	DELTA H	DRY GAS METER TEMPERATURE	STACK TEMP.
1	0.65	0.806226	0.42	69	323
2	0.68	0.824621	0.42	69	324
3	0.71	0.842615	0.42	69	324
4	0.71	0.842615	0.42	69	324
5	0.68	0.824621	0.42	69	324
6	0.62	0.787401	0.42	70	320
7	0.68	0.824621	0.42	70	290
8	0.68	0.824621	0.42	70	280
9	0.71	0.842615	0.42	70	306
10	0.70	0.83666	0.42	70	297
11	0.74	0.860233	0.42	71	302
12	0.72	0.848528	0.42	71	294
13	0.68	0.824621	0.42	70	316
14	0.68	0.824621	0.42	70	291
15	0.70	0.83666	0.42	70	285
16	0.66	0.812404	0.42	72	273
17	0.56	0.748331	0.42	72	283
18	0.55	0.74162	0.42	71	289
19	0.62	0.787401	0.42	71	288
20	0.60	0.774597	0.42	70	286
21	0.54	0.734847	0.42	70	281
22	0.48	0.69282	0.42	71	282
23	0.40	0.632456	0.42	71	282
24	0.43	0.655744	0.42	71	277
AVERAGE	0.6325	0.792979	0.42	70.25	297.54167

TEST LAB DATA SHEET

PROJECT:	GECC	PROJECT NO.:	39400684.00001
SOURCE:	Main Stack	TEST DATE:	5/30/2012
TRAIN I.D.	201A	TEST NO.:	1
COLLECTED BY:	MSM		

CONDENSATION

IMPINGER NO.	INITIAL VOL.,ml/g	FINAL VOL., ml/g	NET GAIN, ml/g
1	356.8	357.9	1.1
2	602.1	755.4	153.3
3	731	769.6	38.6
4	892	911.9	19.9
5			0
6			0
7			0
TOTAL	2581.9	2794.8	212.9

PM2.5 PARTICULATE COLLECTED		
Initial Wt., g	Final Wt., g	Net Gain, g
8.7379	8.7387	0.0008

Project: GECC
Project No: 39400684
Source: Main Stack
Run No.: 1 **PM2.5**

Stack Sampling Calculations

Volume of Water Collected

Vwstd = (Vl0)(0.04707)

Vwstd = 10.02 cubic feet

Volume of Gas Metered, Standard Conditions

Vmstd = ((17.64) (Vm)(Pb + DeltaH/13.6)(gamma))/Tm

Vmstd = 40.399 cubic feet

Moisture Content

Bwo = Vwstd/(Vmstd + Vwstd)

Bwo = 0.20

Molecular Weight of the Dry Gas Stream

Md = (.44)(%CO2) + (.32)(%O2) + (.28)(%CO +%N2)

Md = 29.9

Molecular Weight of Stack Gas

Ms = (Md(1-Bwo) + 18(bwo)

Ms = 27.6

Velocity of Stack Gas

Vs = 174 Cp (DeltaP sq.rt.)((Ts+459.6) X 29.92 X 28.96/Ps/Ms)^.5

Vs = 3,304.0 ft/min

Total Flow of Stack Gas

Qa = As X Vs

Qa = 438,543.12 ACFM

Qs = Qa X 528/Ts X Ps/29.92

Qs = 300,679.00 SCFM

Qstd = Qs(1 - Bwo)

Qstd = 240,917.39 DSCFM

Vsstd = Qstd/As

Vsstd = 1815.06 ft/min

Percent Isokinetic

Is = Vmstd/(An X Time X Vsstd)

Is = 1.04

Particulate Concentration

Cs = (15.43)(Mn)/Vmstd

Cs = 0.0003

Particulate Mass Rate

Pmr = (Mn)(Qstd)(60)/(Vmstd)(453.6)

Pmr = 0.63

STACK TEST CALCULATIONS

Project:	GECC	Barom. Psr.:	29.5		Calculated
Project No:	39400684	Static Psr.:	-0.92	Ps:	29.432
Source:	Main Stack	Delta H @:	1.8345	As:	132.732
Run No.:	1	Gamma:	0.9946	An:	0.000179
Date:	5/30/2012	Pitot Coef.:	0.842		
Sample Volume:	41.345	Stack Dia.:	156 ,in.		
Sample Time:	119.7	Nozzle Dia.:	0.181 ,in.		
O2 Conc.:	5.1	H2O Gain:	212.9 ,ml		
CO2 Conc.:	10.8	Part. Weight:	0.0012 ,g		

PM10

TRAVERSE POINT NUMBER	VELOCITY DELTA P Actual	Sq. Root	DELTA H	DRY GAS METER TEMPERATURE	STACK TEMP.
1	0.65	0.806226	0.42	69	323
2	0.68	0.824621	0.42	69	324
3	0.71	0.842615	0.42	69	324
4	0.71	0.842615	0.42	69	324
5	0.68	0.824621	0.42	69	324
6	0.62	0.787401	0.42	70	320
7	0.68	0.824621	0.42	70	290
8	0.68	0.824621	0.42	70	280
9	0.71	0.842615	0.42	70	306
10	0.70	0.83666	0.42	70	297
11	0.74	0.860233	0.42	71	302
12	0.72	0.848528	0.42	71	294
13	0.68	0.824621	0.42	70	316
14	0.68	0.824621	0.42	70	291
15	0.70	0.83666	0.42	70	285
16	0.66	0.812404	0.42	72	273
17	0.56	0.748331	0.42	72	283
18	0.55	0.74162	0.42	71	289
19	0.62	0.787401	0.42	71	288
20	0.60	0.774597	0.42	70	286
21	0.54	0.734847	0.42	70	281
22	0.48	0.69282	0.42	71	282
23	0.40	0.632456	0.42	71	282
24	0.43	0.655744	0.42	71	277
AVERAGE	0.6325	0.792979	0.42	70.25	297.54167

URS

TEST LAB DATA SHEET

PROJECT:	GECC	PROJECT NO.:	39400684.00001
SOURCE:	Main Stack	TEST DATE:	5/30/2012
TRAIN I.D.	201A	TEST NO.:	1
COLLECTED BY:	MSM		

CONDENSATION

IMPINGER NO.	INITIAL VOL.,ml/g	FINAL VOL., ml/g	NET GAIN, ml/g
1	356.8	357.9	1.1
2	602.1	755.4	153.3
3	731	769.6	38.6
4	892	911.9	19.9
5			0
6			0
7			0
TOTAL	2581.9	2794.8	212.9

PM10 PARTICULATE COLLECTED		
Initial Wt., g	Final Wt., g	Net Gain, g
8.7523	8.7535	0.0012

Project: GECC
Project No: 39400684
Source: Main Stack
Run No.: 1 **PM10**

Stack Sampling Calculations

Volume of Water Collected

Vwstd = (Vl0)(0.04707)

Vwstd = 10.02 cubic feet

Volume of Gas Metered, Standard Conditions

Vmstd = ((17.64) (Vm)(Pb + DeltaH/13.6)(gamma))/Tm

Vmstd = 40.399 cubic feet

Moisture Content

Bwo = Vwstd/(Vmstd + Vwstd)

Bwo = 0.20

Molecular Weight of the Dry Gas Stream

Md = (.44)(%CO2) + (.32)(%O2) + (.28)(%CO +%N2)

Md = 29.9

Molecular Weight of Stack Gas

Ms = (Md(1-Bwo) + 18(bwo)

Ms = 27.6

Velocity of Stack Gas

Vs = 174 Cp (DeltaP sq.rt.)((Ts+459.6) X 29.92 X 28.96/Ps/Ms)^.5

Vs = 3,304.0 ft/min

Total Flow of Stack Gas

Qa = As X Vs

Qa = 438,543.12 ACFM

Qs = Qa X 528/Ts X Ps/29.92

Qs = 300,679.00 SCFM

Qstd = Qs(1 - Bwo)

Qstd = 240,917.39 DSCFM

Vsstd = Qstd/As

Vsstd = 1815.06 ft/min

Percent Isokinetic

Is = Vmstd/(An X Time X Vsstd)

Is = 1.04

Particulate Concentration

Cs = (15.43)(Mn)/Vmstd

Cs = 0.0005

Particulate Mass Rate

Pmr = (Mn)(Qstd)(60)/(Vmstd)(453.6)

Pmr = 0.95

Method 201/202

Test Run – 2

URS

STACK TEST DATA SHEET

TEST METHOD: M201/202

PROJECT:	GECC	BAROMETRIC (Pb):	29.44	STACK DIA.:	156"
PROJECT NO.:	39400684.00001	STATIC (Ps):	-0.92	PORT LENGTH:	6"
SOURCE:	Main Stack	CONSOLE I.D.:	2	PROBE/PITOT I.D.:	6-004 / PT-6
RUN I.D.:	2	DELTA H @:	1.8345	PITOT COEF.:	0.842
DATE:	5-30-12	GAMMA:	0.9946	PROBE LINER:	glass
OPERATORS:	MM BS TG TB	TEST DURATION:	~120	FILTER NO.:	47-188

TRAVERSE POINT NUMBER	SAMPLING TIME Clock	SAMPLING TIME Sample	VELOCITY ΔP	SAMPLE ΔH	GAS SAMPLE VOLUME	STACK TEMP.	PROBE TEMP.	FILTER BOX TEMP.	LAST IMPINGER TEMP.	DRY GAS METER TEMP.	TRAIN VACUUM	Filter Δ2
1	13:55	0	0.66	0.42	432.086	280	246	241	63	70	2	70
2		5.2	0.71	0.42	433.90	285	246	245	61	70	2	73
3		10.6	0.71	0.42	436.10	282	250	244	62	70	2	75
4		16.6	0.67	0.42	438.60	282	250	250	60	70	2	78
5		21.2	0.55	0.42	439.80	283	250	251	60	70	2	80
6		25.9	0.57	0.42	441.30	283	251	253	59	70	2	81
7		30.8	0.65	0.42	443.40	281	252	253	58	70	2	80
8		35.9	0.67	0.42	444.80	284	248	239	58	71	2	79
9		40.2	0.65	0.42	446.90	284	247	239	58	71	2	79
10		46.3	0.60	0.42	448.60	284	249	247	60	71	2	81
11	51.3	51.8	0.45	0.42	450.10	274	250	242	58	73	2	82
12	55.4	56.0	0.45	0.42	452.10	282	251	243	58	73	2	80
13	15:02	59.8	0.58	0.42	453.40	284	249	250	63	78	2	78
14		64.7	0.58	0.42	456.00	283	250	251	61	78	2	79
15		69.6	0.56	0.42	457.40	284	245	246	62	77	3	79
16		74.4	0.45	0.42	459.20	287	249	248	61	75	3	78
17		78.7	0.46	0.42	460.80	287	245	247	61	75	3	77
18		83.0	0.44	0.42	462.90	285	248	248	61	75	3	78
19		87.2	0.68	0.42	464.60	286	248	244	60	72	3	77
20		92.5	0.68	0.42	466.50	282	247	245	60	72	3	78
21		97.8	0.68	0.42	468.30	285	248	240	61	72	3	78
22		102.1	0.57	0.42	470.10	281	249	244	62	72	3	83
23		107.9	0.58	0.42	472.00	280	248	242	63	72	3	81
24		112.8	0.55	0.42	473.90	283	250	250	63	72	3	81
	16:04	117.5			474.90							
AVERAGE					42.82							

PITOT LEAK CHECK (> 3")		
INITIAL	(+) ✓	(-) ✓
FINAL	(+)	(-)

TRAIN LEAK CHECK (ft³ @ in, Hg.)	
INITIAL	0.0 @ 15
FINAL	0.0 @ 5

NOZZLE MEASUREMENT	
NOZZLE I.D.:	N3
1	0.181
2	0.181
3	0.181
Avg.	0.181

STACK GAS ANALYSIS			
	CO2	O2	
1	10.9	5.1	
2	10.5	5.7	
3	10.7	5.5	
Avg.	10.7	5.4	

NOTES:

URS

IMPINGER LAB SHEET

Test Method: 101/202

PROJECT: GECC JOB NO.: 39400684.00001

SOURCE: Main Stack DATE: 5/30/12

TRAIN I.D.: 201/202-2 TEST NO.: 2

COLLECTED BY: _____

IMPINGER WEIGHTS

IMPINGER NO.	INITIAL VOL., ml/g	FINAL VOL., ml/g	NET GAIN, ml/g
1	351.2	351.8	0.6
2	599.7	790.4	190.7
3	724.5	753.6	29.1
4	877.0	894.4	17.4
5			
6			
7			
TOTAL	2552.4	2790.2	237.8

CALIBRATION WEIGHT

CALIBRATED VALUE, g	MEASURED VALUE, g	DIFFERENCE, g

NOTES: _____

_____

GECC Main Stack
Run - 2

EPA Method 201A: PM10 Sampling Using a Constant-Rate Cyclone
Pretest Calculations for Sampling Rate and Nozzle Size

Calculation of Cyclone Sampling Rate					
Data Entry	Symbol	Units	Run 1	Run 2	Run 3
Standard Temperature	Tstd	deg F	68.0		
Standard Pressure	Pstd	in. Hg	29.92		
Pitot Coefficient	Cp	--	0.84		
Meter Coefficient	Yi	--	0.9946		
Meter dH@	dH@	in. H2O	1.8345		
Barometric Pressure	Pbar	in. Hg	29.50		
Stack Static Pressure	Pg	in. WC	-0.92		
Stack Temperature	Ts	deg. F	**260.0**	**210.0**	**310.0**
Meter Temperature	Tm	deg. F	80.0		
Stack Gas Characteristics					
Moisture Content	Bws	--	0.17		
Oxygen Content	%O2	%	5.0		
Carbon Dioxide Content	%CO2	%	10.7		
Calculations	Symbol	Units	Run 1	Run 2	Run 3
Abs. Meter Temperature	Tma	deg. R	540.0	540.0	540.0
Stack Parameters					
Abs. Stack Pressure	Ps	in. Hg	29.43		
Abs. Stack Temperature	Tsa	deg. R	720.0	670.0	770.0
MW, Dry	Md	lb/lb-mol	29.91		
MW, Wet	Mw	lb/lb-mol	27.89		
Viscosity	mu	micropoise	211.01	197.49	224.69
Target Flow Rate, Cyclone	Qs	ACFM	0.576	0.528	0.626
Target dH for Qs	dH	in. H2O	0.42	0.40	0.43

Calculation of Cyclone Nozzle Sizes				
Nozzle Selection	Symbol	Units	Calculated for Run 1 Data	
Abs. Meter Temperature	Tma	deg. R	540.0	
Stack Parameters				
Abs. Stack Pressure	Ps	in. Hg	29.43	
Abs. Stack Temperature	Tsa	deg. R	*720.0*	** Reference above CELL*
MW, Wet	Mw	lb/lb-mol	27.89	
Viscosity	mu	mpoise	*211.01*	*Check value*
Pitot Coefficient	Cp	--	0.84	
Target Flow Rate, Cyclone	Qs	ACFM	*0.576*	*Check value*

** Enter appropriate value by typing "=" and clicking on desired CELL.*

Calculations	Symbol	Units	Calculated for Run 1 Data			
Target Flow Rate, Cyclone	Qs	ACFM	**0.576**			
Nozzle ID No.	No.	--	NA	NA	NA	
Nozzle Diameter	Dn	in.	**0.181**	**0.215**	**0.197**	From M201A Fig 2
Nozzle Velocity	Vn	fps	53.73	38.08	45.35	
Min. Velocity	Vmin.	fps	37.31	23.07	29.88	
Rmin.	Rmin.	--	0.6944	0.6060	0.6589	
Max. Velocity	Vmax	fps	68.08	49.87	58.31	
Rmax.	Rmax	--	1.2672	1.3097	1.2856	
Min. Velocity Head	dPmin	in. WC	0.308	0.118	0.197	
Max. Velocity Head	dPmax	in. WC	1.025	0.550	0.752	
		Mean DP	0.6663059	0.3337824	0.4745795	Pick closest to average during prelim

GECC Main Stack
Run - 2

EPA Method 201A: PM10 Sampling Using a Constant-Rate Cyclone
Variation of Dwell Time v. Differential Pressure

Data Entry	Symbol	Units	Run 1
Average DP (from previous test)	DP(avg)	in. WC	0.61
Total Run Time	t,total	min	120
Number of Traverse Points	n	--	24
Average Time per Traverse Point	t,avg	min	5

Change this Cell to avg

Calculation of Dwell Time Factor

use this column for DP observed during the run

	DP @ Pt DPi	Dwell Factor Ki	Est. Time ti				
ti = t,avg * (DPi÷dp,avg)^0.5	0.66	1.04	5.2	1	5.2		
	0.71	1.08	5.4	2	5.4	10.6	
	0.71	1.08	5.4	3	5.4	16.0	
	0.67	1.05	5.2	4	5.2	21.2	
	0.55	0.95	4.7	5	4.7	25.9	
	0.57	0.97	4.8	6	4.8	30.8	
	0.65	1.03	5.2	7	5.2	35.9	
	0.67	1.05	5.2	8	5.2	41.2	
	0.65	1.03	5.2	9	5.2	46.3	
	0.6	0.99	5.0	10	5.0	51.3	
	0.45	0.86	4.3	11	4.3	55.6	
	0.45	0.86	4.3	12	4.3	59.8	
	0.58	0.97	4.9	1	4.9	64.7	5
	0.58	0.97	4.9	2	4.9	69.6	9.9
	0.56	0.96	4.8	3	4.8	74.4	14.7
	0.45	0.86	4.3	4	4.3	78.7	19.0
	0.46	0.87	4.3	5	4.3	83.0	23.3
	0.44	0.85	4.2	6	4.2	87.2	27.5
	0.68	1.05	5.3	7	5.3	92.5	32.8
	0.68	1.05	5.3	8	5.3	97.8	38.1
	0.68	1.05	5.3	9	5.3	103.1	43.4
	0.57	0.97	4.8	10	4.8	107.9	48.2
	0.58	0.97	4.9	11	4.9	112.8	53.1
	0.55	0.95	4.7	12	4.7	117.5	57.8

117.5 Total minutes

dp	temp
0.66	260
0.71	
0.71	
0.67	
0.55	
0.57	
0.65	
0.67	
0.65	
0.6	
0.45	
0.45	

0.611666667 260

STACK TEST CALCULATIONS

Project:	GECC	Barom. Psr.:	29.5		Calculated
Project No:	39400684	Static Psr.:	-0.92	Ps:	29.432
Source:	Main Stack	Delta H @:	1.8345	As:	132.732
Run No.:	2	Gamma:	0.9946	An:	0.000179
Date:	5/30/2012	Pitot Coef.:	0.842		
Sample Volume:	42.82	Stack Dia.:	156 ,in.		
Sample Time:	117.5	Nozzle Dia.:	0.181 ,in.		
O2 Conc.:	5.4	H2O Gain:	237.8 ,ml		
CO2 Conc.:	10.7	Part. Weight:	0.0097 ,g		

CPM

TRAVERSE POINT NUMBER	VELOCITY DELTA P Actual	Sq. Root	DELTA H	DRY GAS METER TEMPERATURE	STACK TEMP.
1	0.66	0.812404	0.42	70	280
2	0.71	0.842615	0.42	70	285
3	0.71	0.842615	0.42	70	282
4	0.67	0.818535	0.42	70	282
5	0.55	0.74162	0.42	70	283
6	0.57	0.754983	0.42	70	283
7	0.65	0.806226	0.42	70	281
8	0.67	0.818535	0.42	71	284
9	0.65	0.806226	0.42	71	284
10	0.60	0.774597	0.42	71	284
11	0.45	0.67082	0.42	73	274
12	0.45	0.67082	0.42	73	282
13	0.58	0.761577	0.42	78	284
14	0.58	0.761577	0.42	78	283
15	0.56	0.748331	0.42	77	284
16	0.45	0.67082	0.42	75	287
17	0.46	0.678233	0.42	75	287
18	0.44	0.663325	0.42	75	285
19	0.68	0.824621	0.42	72	286
20	0.68	0.824621	0.42	72	282
21	0.68	0.824621	0.42	72	285
22	0.57	0.754983	0.42	72	281
23	0.58	0.761577	0.42	72	280
24	0.55	0.74162	0.42	72	283
AVERAGE	0.58958333	0.765663	0.42	72.45833	282.9583

Project: GECC
Project No: 39400684
Source: Main Stack
Run No.: 2 **CPM**

Stack Sampling Calculations

Volume of Water Collected

Vwstd = (Vl0)(0.04707)

Vwstd = 11.19 cubic feet

Volume of Gas Metered, Standard Conditions

Vmstd = ((17.64) (Vm)(Pb + DeltaH/13.6)(gamma))/Tm

Vmstd = 41.666 cubic feet

Moisture Content

Bwo = Vwstd/(Vmstd + Vwstd)

Bwo = 0.21

Molecular Weight of the Dry Gas Stream

Md = (.44)(%CO2) + (.32)(%O2) + (.28)(%CO +%N2)

Md = 29.9

Molecular Weight of Stack Gas

Ms = (Md(1-Bwo) + 18(bwo)

Ms = 27.4

Velocity of Stack Gas

Vs = 174 Cp (DeltaP sq.rt.)((Ts+459.6) X 29.92 X 28.96/Ps/Ms)^.5

Vs = 3,168.4 ft/min

Total Flow of Stack Gas

Qa = As X Vs

Qa = 420,547.72 ACFM

Qs = Qa X 528/Ts X Ps/29.92

Qs = 294,000.55 SCFM

Qstd = Qs(1 - Bwo)

Qstd = 231,744.56 DSCFM

Vsstd = Qstd/As

Vsstd = 1745.96 ft/min

Percent Isokinetic

Is = Vmstd/(An X Time X Vsstd)

Is = 1.14

Particulate Concentration

Cs = (15.43)(Mn)/Vmstd

Cs = 0.0036

Particulate Mass Rate

Pmr = (Mn)(Qstd)(60)/(Vmstd)(453.6)

Pmr = 7.14

STACK TEST CALCULATIONS

Project:	GECC	Barom. Psr.:	29.5		Calculated
Project No:	39400684	Static Psr.:	-0.92	Ps:	29.432
Source:	Main Stack	Delta H @:	1.8345	As:	132.732
Run No.:	2	Gamma:	0.9946	An:	0.000179
Date:	5/30/2012	Pitot Coef.:	0.842		
Sample Volume:	42.82	Stack Dia.:	156 ,in.		
Sample Time:	117.5	Nozzle Dia.:	0.181 ,in.		
O2 Conc.:	5.4	H2O Gain:	237.8 ,ml		
CO2 Conc.:	10.7	Part. Weight:	0.0006 ,g		

PM2.5

TRAVERSE POINT NUMBER	VELOCITY DELTA P Actual	Sq. Root	DELTA H	DRY GAS METER TEMPERATURE	STACK TEMP.
1	0.66	0.812404	0.42	70	280
2	0.71	0.842615	0.42	70	285
3	0.71	0.842615	0.42	70	282
4	0.67	0.818535	0.42	70	282
5	0.55	0.74162	0.42	70	283
6	0.57	0.754983	0.42	70	283
7	0.65	0.806226	0.42	70	281
8	0.67	0.818535	0.42	71	284
9	0.65	0.806226	0.42	71	284
10	0.60	0.774597	0.42	71	284
11	0.45	0.67082	0.42	73	274
12	0.45	0.67082	0.42	73	282
13	0.58	0.761577	0.42	78	284
14	0.58	0.761577	0.42	78	283
15	0.56	0.748331	0.42	77	284
16	0.45	0.67082	0.42	75	287
17	0.46	0.678233	0.42	75	287
18	0.44	0.663325	0.42	75	285
19	0.68	0.824621	0.42	72	286
20	0.68	0.824621	0.42	72	282
21	0.68	0.824621	0.42	72	285
22	0.57	0.754983	0.42	72	281
23	0.58	0.761577	0.42	72	280
24	0.55	0.74162	0.42	72	283
AVERAGE	0.58958333	0.765663	0.42	72.45833	282.9583

TEST LAB DATA SHEET

PROJECT:	GECC	PROJECT NO.:	39400684.00001
SOURCE:	Main Stack	TEST DATE:	5/30/2012
TRAIN I.D.	201A	TEST NO.:	2
COLLECTED BY:	MSM		

CONDENSATION

IMPINGER NO.	INITIAL VOL.,ml/g	FINAL VOL., ml/g	NET GAIN, ml/g
1	351.2	351.8	0.6
2	599.7	790.4	190.7
3	724.5	753.6	29.1
4	877.0	894.4	17.4
5			0.0
6			0.0
7			0.0
TOTAL	2552.4	2790.2	237.8

PM2.5 PARTICULATE COLLECTED		
Initial Wt., g	Final Wt., g	Net Gain, g
8.6552	8.6558	0.0006

Project: GECC
Project No: 39400684
Source: Main Stack
Run No.: 2 **PM2.5**

Stack Sampling Calculations

Volume of Water Collected

Vwstd = (Vl0)(0.04707)

Vwstd = 11.19 cubic feet

Volume of Gas Metered, Standard Conditions

Vmstd = ((17.64) (Vm)(Pb + DeltaH/13.6)(gamma))/Tm

Vmstd = 41.666 cubic feet

Moisture Content

Bwo = Vwstd/(Vmstd + Vwstd)

Bwo = 0.21

Molecular Weight of the Dry Gas Stream

Md = (.44)(%CO2) + (.32)(%O2) + (.28)(%CO +%N2)

Md = 29.9

Molecular Weight of Stack Gas

Ms = (Md(1-Bwo) + 18(bwo)

Ms = 27.4

Velocity of Stack Gas

Vs = 174 Cp (DeltaP sq.rt.)((Ts+459.6) X 29.92 X 28.96/Ps/Ms)^.5

Vs = 3,168.4 ft/min

Total Flow of Stack Gas

Qa = As X Vs

Qa = 420,547.72 ACFM

Qs = Qa X 528/Ts X Ps/29.92

Qs = 294,000.55 SCFM

Qstd = Qs(1 - Bwo)

Qstd = 231,744.56 DSCFM

Vsstd = Qstd/As

Vsstd = 1745.96 ft/min

Percent Isokinetic

Is = Vmstd/(An X Time X Vsstd)

Is = 1.14

Particulate Concentration

Cs = (15.43)(Mn)/Vmstd

Cs = 0.0002

Particulate Mass Rate

Pmr = (Mn)(Qstd)(60)/(Vmstd)(453.6)

Pmr = 0.44

STACK TEST CALCULATIONS

Project:	GECC	Barom. Psr.:	29.5		Calculated
Project No:	39400684	Static Psr.:	-0.92	Ps:	29.432
Source:	Main Stack	Delta H @:	1.8345	As:	132.732
Run No.:	2	Gamma:	0.9946	An:	0.000179
Date:	5/30/2012	Pitot Coef.:	0.842		
Sample Volume:	42.82	Stack Dia.:	156 ,in.		
Sample Time:	117.5	Nozzle Dia.:	0.181 ,in.		
O2 Conc.:	5.4	H2O Gain:	237.8 ,ml		
CO2 Conc.:	10.7	Part. Weight:	0.0013 ,g		

PM10

TRAVERSE POINT NUMBER	VELOCITY DELTA P Actual	Sq. Root	DELTA H	DRY GAS METER TEMPERATURE	STACK TEMP.
1	0.66	0.812404	0.42	70	280
2	0.71	0.842615	0.42	70	285
3	0.71	0.842615	0.42	70	282
4	0.67	0.818535	0.42	70	282
5	0.55	0.74162	0.42	70	283
6	0.57	0.754983	0.42	70	283
7	0.65	0.806226	0.42	70	281
8	0.67	0.818535	0.42	71	284
9	0.65	0.806226	0.42	71	284
10	0.60	0.774597	0.42	71	284
11	0.45	0.67082	0.42	73	274
12	0.45	0.67082	0.42	73	282
13	0.58	0.761577	0.42	78	284
14	0.58	0.761577	0.42	78	283
15	0.56	0.748331	0.42	77	284
16	0.45	0.67082	0.42	75	287
17	0.46	0.678233	0.42	75	287
18	0.44	0.663325	0.42	75	285
19	0.68	0.824621	0.42	72	286
20	0.68	0.824621	0.42	72	282
21	0.68	0.824621	0.42	72	285
22	0.57	0.754983	0.42	72	281
23	0.58	0.761577	0.42	72	280
24	0.55	0.74162	0.42	72	283
AVERAGE	0.58958333	0.765663	0.42	72.45833	282.9583

URS

TEST LAB DATA SHEET

PROJECT:	GECC	PROJECT NO.:	39400684.00001
SOURCE:	Main Stack	TEST DATE:	5/30/2012
TRAIN I.D.	201A	TEST NO.:	2
COLLECTED BY:	MSM		

CONDENSATION

IMPINGER NO.	INITIAL VOL.,ml/g	FINAL VOL., ml/g	NET GAIN, ml/g
1	351.2	351.8	0.6
2	599.7	790.4	190.7
3	724.5	753.6	29.1
4	877.0	894.4	17.4
5			0.0
6			0.0
7			0.0
TOTAL	2552.4	2790.2	237.8

PM10 PARTICULATE COLLECTED		
Initial Wt., g	Final Wt., g	Net Gain, g
8.7215	8.7228	0.0013

Project: GECC
Project No: 39400684
Source: Main Stack
Run No.: 2 **PM10**

Stack Sampling Calculations

Volume of Water Collected

Vwstd = (Vl0)(0.04707)

Vwstd = 11.19 cubic feet

Volume of Gas Metered, Standard Conditions

Vmstd = ((17.64) (Vm)(Pb + DeltaH/13.6)(gamma))/Tm

Vmstd = 41.666 cubic feet

Moisture Content

Bwo = Vwstd/(Vmstd + Vwstd)

Bwo = 0.21

Molecular Weight of the Dry Gas Stream

Md = (.44)(%CO2) + (.32)(%O2) + (.28)(%CO +%N2)

Md = 29.9

Molecular Weight of Stack Gas

Ms = (Md(1-Bwo) + 18(bwo)

Ms = 27.4

Velocity of Stack Gas

Vs = 174 Cp (DeltaP sq.rt.)((Ts+459.6) X 29.92 X 28.96/Ps/Ms)^.5

Vs = 3,168.4 ft/min

Total Flow of Stack Gas

Qa = As X Vs

Qa = 420,547.72 ACFM

Qs = Qa X 528/Ts X Ps/29.92

Qs = 294,000.55 SCFM

Qstd = Qs(1 - Bwo)

Qstd = 231,744.56 DSCFM

Vsstd = Qstd/As

Vsstd = 1745.96 ft/min

Percent Isokinetic

Is = Vmstd/(An X Time X Vsstd)

Is = 1.14

Particulate Concentration

Cs = (15.43)(Mn)/Vmstd

Cs = 0.0005

Particulate Mass Rate

Pmr = (Mn)(Qstd)(60)/(Vmstd)(453.6)

Pmr = 0.96

Method 201/202

Test Run – 3

URS **STACK TEST DATA SHEET** TEST METHOD: 201/202

PROJECT:	GECC	BAROMETRIC (Pb):	29.35	STACK DIA.:	156"
PROJECT NO.:	39400684.00001	STATIC (Ps):	-.92	PORT LENGTH:	6"
SOURCE:	Main Stack	CONSOLE I.D.:	2	PROBE/PITOT I.D.:	6-004/PT-6
RUN I.D.:	3	DELTA H @:	1.8345	PITOT COEF.:	0.842
DATE:	5-30-12	GAMMA:	0.9946	PROBE LINER:	glass
OPERATORS:	MM BJ TB TG	TEST DURATION:	2120	FILTER NO.:	47-187

TRAVERSE POINT NUMBER	SAMPLING TIME Clock	SAMPLING TIME Sample	VELOCITY ΔP	SAMPLE ΔH	GAS SAMPLE VOLUME	STACK TEMP.	PROBE TEMP.	FILTER BOX TEMP.	LAST IMPINGER TEMP.	DRY GAS METER TEMP.	TRAIN VACUUM	Filter #2	
1	19:02	0	0.66	0.42	475.205	~~252~~ 262	250	246	59	70	2	80	262
2		5.2	0.68	0.42	478.00	~~265~~ 265	250	244	61	70	2	77	265
3		10.5	0.68	0.42	479.70	~~266~~ 266	249	243	59	70	2	77	266
4		15.8	0.61	0.42	481.20	~~265~~ 265	251	245	60	70	2	78	265
5		20.8	0.52	0.42	483.30	262	250	245	58	71	2	78	
6		25.4	0.52	0.42	484.40	260	249	246	58	71	2	79	
7		30.0	0.61	0.42	486.80	253	247	245	48	72	2	72	
8		35.0	0.59	0.42	488.00	254	247	244	45	73	2	74	
9		39.9	0.62	0.42	490.00	255	246	241	45	73	2	74	
10		44.9	0.54	0.42	491.80	254	246	244	45	73	2	74	
11		49.6	0.41	0.42	493.70	252	247	244	44	73	2	74	
12		53.7	0.41	0.42	495.60	251	247	243	48	74	2	74	
13		57.8	0.68	0.42	496.00	256	249	245	52	74	2	76	
14		63.1	0.73	0.42	498.10	257	249	243	52	73	2	76	
15		68.6	0.75	0.42	499.60	259	249	242	53	73	2	78	
16		74.1	0.63	0.42	501.70	255	249	245	50	73	2	78	
17		79.2	0.58	0.42	503.70	251	249	245	57	74	2	82	
18		84.1	0.60	0.42	505.40	250	249	245	57	74	2	84	
19	①	89.1	0.78	0.42	507.00	244	245	246	47	74	2	58	
20	②	94.7	0.84	0.42	509.10	246	243	243	48	74	2	67	
21		100.6	0.82	0.42	510.70	248	244	245	49	74	2	70	
22		106.4	0.78	0.42	512.60	259	246	246	50	73	2	69	
23		112.0	0.83	0.42	514.30	263	246	245	51	74	2	72	
24		117.8	0.80	0.42	515.80	261	244	243	51	74	2	73	
	24:00	123.4			518.470								
AVERAGE					43.265								

PITOT LEAK CHECK (> 3")		
INITIAL	(+) ✓	(-) ✓
FINAL	(+)	(-)
TRAIN LEAK CHECK (ft^3 @ in, Hg.)		
INITIAL	0.0 @ 15	
FINAL	0.0 @ 5	

NOZZLE MEASUREMENT	
NOZZLE I.D.:	N3
1	0.181
2	0.181
3	0.181
Avg.	0.181

STACK GAS ANALYSIS			
	CO2	O2	
1	9.5	7.0	
2	9.0	7.9	
3	9.2	7.6	
Avg.	9.2	7.5	

NOTES: ① Test stopped due to hot car problem @ 20:40
② 23:27 restart test

URS

IMPINGER LAB SHEET

Test Method: _____

PROJECT: GECC JOB NO.: 39400684.00001

SOURCE: Main Stack DATE: 5/30/12

TRAIN I.D.: 201/202 - 3 TEST NO.: 3

COLLECTED BY: MSM

IMPINGER WEIGHTS

IMPINGER NO.	INITIAL VOL., ml/g	FINAL VOL., ml/g	NET GAIN, ml/g
1	358.3	360.2	1.9
2	598.7	787.5	188.8
3	734.5	760.0	25.5
4	888.0	900.8	12.8
5			
6			
7			
TOTAL	2579.5	2808.5	229.0

CALIBRATION WEIGHT

CALIBRATED VALUE, g	MEASURED VALUE, g	DIFFERENCE, g

NOTES: _____

GECC Main Stack
Run - 3

EPA Method 201A: PM10 Sampling Using a Constant-Rate Cyclone
Pretest Calculations for Sampling Rate and Nozzle Size

Calculation of Cyclone Sampling Rate					
Data Entry	Symbol	Units	Run 1	Run 2	Run 3
Standard Temperature	Tstd	deg F	68.0		
Standard Pressure	Pstd	in. Hg	29.92		
Pitot Coefficient	Cp	--	0.84		
Meter Coefficient	Yi	--	0.9946		
Meter dH@	dH@	in. H2O	1.8345		
Barometric Pressure	Pbar	in. Hg	29.50		
Stack Static Pressure	Pg	in. WC	-0.92		
Stack Temperature	Ts	deg. F	**260.0**	**210.0**	**310.0**
Meter Temperature	Tm	deg. F	80.0		
Stack Gas Characteristics					
Moisture Content	Bws	--	0.17		
Oxygen Content	%O2	%	9.2		
Carbon Dioxide Content	%CO2	%	7.5		
Calculations	Symbol	Units	Run 1	Run 2	Run 3
Abs. Meter Temperature	Tma	deg. R	540.0	540.0	540.0
Stack Parameters					
Abs. Stack Pressure	Ps	in. Hg	29.43		
Abs. Stack Temperature	Tsa	deg. R	720.0	670.0	770.0
MW, Dry	Md	lb/lb-mol	29.57		
MW, Wet	Mw	lb/lb-mol	27.60		
Viscosity	mu	micropoise	213.24	199.72	226.92
Target Flow Rate, Cyclone	Qs	ACFM	0.584	0.535	0.634
Target dH for Qs	dH	in. H2O	0.42	0.41	0.43

Calculation of Cyclone Nozzle Sizes				
Nozzle Selection	Symbol	Units	Calculated for Run 1 Data	
Abs. Meter Temperature	Tma	deg. R	540.0	
Stack Parameters				
Abs. Stack Pressure	Ps	in. Hg	29.43	
Abs. Stack Temperature	Tsa	deg. R	*720.0*	** Reference above CELL*
MW, Wet	Mw	lb/lb-mol	27.60	
Viscosity	mu	mpoise	*213.24*	*Check value*
Pitot Coefficient	Cp	--	0.84	
Target Flow Rate, Cyclone	Qs	ACFM	*0.584*	*Check value*

** Enter appropriate value by typing "=" and clicking on desired CELL.*

Calculations	Symbol	Units	Calculated for Run 1 Data		
Target Flow Rate, Cyclone	Qs	ACFM	**0.584**		
Nozzle ID No.	No.	--	NA	NA	NA
Nozzle Diameter	Dn	in.	**0.181**	**0.215**	**0.197** From M201A Fig 2
Nozzle Velocity	Vn	fps	54.46	38.60	45.97
Min. Velocity	Vmin.	fps	37.84	23.42	30.31
Rmin.	Rmin.	--	0.6948	0.6067	0.6594
Max. Velocity	Vmax	fps	69.00	50.54	59.09
Rmax.	Rmax	--	1.2670	1.3093	1.2854
Min. Velocity Head	dPmin	in. WC	0.313	0.120	0.201
Max. Velocity Head	dPmax	in. WC	1.042	0.559	0.764
		Mean DP	0.6776115	0.3394601	0.4826376 Pick closest to average during prelim

GECC Main Stack
Run - 3

EPA Method 201A: PM10 Sampling Using a Constant-Rate Cyclone
Variation of Dwell Time v. Differential Pressure

Data Entry	Symbol	Units	Run 1
Average DP (from previous test)	DP(avg)	in. WC	0.61
Total Run Time	t,total	min	120
Number of Traverse Points	n	--	24
Average Time per Traverse Point	t,avg	min	5

Change this Cell to avg

Calculation of Dwell Time Factor

use this column for DP observed during the run

	DP @ Pt DPi	Dwell Factor Ki	Est. Time ti				
ti = t,avg * (DPi÷dp,avg)^0.5	0.66	1.04	5.2	1	5.2		
	0.68	1.05	5.3	2	5.3	10.5	
	0.68	1.05	5.3	3	5.3	15.7	
	0.61	1.00	5.0	4	5.0	20.7	
	0.52	0.92	4.6	5	4.6	25.3	
	0.52	0.92	4.6	6	4.6	30.0	
	0.61	1.00	5.0	7	5.0	34.9	
	0.59	0.98	4.9	8	4.9	39.9	
	0.62	1.01	5.0	9	5.0	44.9	
	0.54	0.94	4.7	10	4.7	49.6	
	0.41	0.82	4.1	11	4.1	53.7	
	0.41	0.82	4.1	12	4.1	57.8	
	0.68	1.05	5.3	1	5.3	63.0	3.1
	0.73	1.09	5.5	2	5.5	68.5	8.6
	0.75	1.11	5.5	3	5.5	74.0	14.1
	0.63	1.01	5.1	4	5.1	79.1	19.2
	0.58	0.97	4.9	5	4.9	84.0	24.0
	0.6	0.99	5.0	6	5.0	88.9	29.0
	0.78	1.13	5.6	7	5.6	94.6	34.6
	0.84	1.17	5.9	8	5.9	100.4	40.5
	0.82	1.16	5.8	9	5.8	106.2	46.3
	0.78	1.13	5.6	10	5.6	111.9	51.9
	0.83	1.16	5.8	11	5.8	117.7	57.8
	0.8	1.14	5.7	12	5.7	123.4	63.5

123.4 Total minutes

dp	temp
0.66	260
0.71	
0.71	
0.67	
0.55	
0.57	
0.65	
0.67	
0.65	
0.6	
0.45	
0.45	

0.611666667 260

STACK TEST CALCULATIONS

Project:	GECC	Barom. Psr.:	29.5		Calculated
Project No:	39400684	Static Psr.:	-0.92	Ps:	29.432
Source:	Main Stack	Delta H @:	1.8345	As:	132.732
Run No.:	3	Gamma:	0.9946	An:	0.000179
Date:	5/30/2012	Pitot Coef.:	0.842		
Sample Volume:	43.265	Stack Dia.:	156 ,in.		
Sample Time:	123.4	Nozzle Dia.:	0.181 ,in.		
O2 Conc.:	7.5	H2O Gain:	229 ,ml		
CO2 Conc.:	9.2	Part. Weight:	0.0067 ,g		

CPM

TRAVERSE POINT NUMBER	VELOCITY DELTA P Actual	Sq. Root	DELTA H	DRY GAS METER TEMPERATURE	STACK TEMP.
1	0.66	0.812404	0.42	70	262
2	0.68	0.824621	0.42	70	265
3	0.68	0.824621	0.42	70	266
4	0.61	0.781025	0.42	70	265
5	0.52	0.72111	0.42	71	262
6	0.52	0.72111	0.42	71	260
7	0.61	0.781025	0.42	72	253
8	0.59	0.768115	0.42	73	254
9	0.62	0.787401	0.42	73	255
10	0.54	0.734847	0.42	73	254
11	0.41	0.640312	0.42	73	252
12	0.41	0.640312	0.42	74	251
13	0.68	0.824621	0.42	74	256
14	0.73	0.8544	0.42	73	257
15	0.75	0.866025	0.42	73	259
16	0.63	0.793725	0.42	73	255
17	0.58	0.761577	0.42	74	251
18	0.60	0.774597	0.42	74	250
19	0.78	0.883176	0.42	74	244
20	0.84	0.916515	0.42	74	246
21	0.82	0.905539	0.42	74	248
22	0.78	0.883176	0.42	73	259
23	0.83	0.911043	0.42	74	263
24	0.80	0.894427	0.42	74	261
AVERAGE	0.65291667	0.804405	0.42	72.66667	256.1667

Project: GECC
Project No: 39400684
Source: Main Stack
Run No.: 3 **CPM**

Stack Sampling Calculations

Volume of Water Collected

Vwstd = (VI0)(0.04707)

Vwstd = 10.78 cubic feet

Volume of Gas Metered, Standard Conditions

Vmstd = ((17.64) (Vm)(Pb + DeltaH/13.6)(gamma))/Tm

Vmstd = 42.083 cubic feet

Moisture Content

Bwo = Vwstd/(Vmstd + Vwstd)

Bwo = 0.20

Molecular Weight of the Dry Gas Stream

Md = (.44)(%CO2) + (.32)(%O2) + (.28)(%CO +%N2)

Md = 29.8

Molecular Weight of Stack Gas

Ms = (Md(1-Bwo) + 18(bwo)

Ms = 27.4

Velocity of Stack Gas

Vs = 174 Cp (DeltaP sq.rt.)((Ts+459.6) X 29.92 X 28.96/Ps/Ms)^.5

Vs = 3,269.9 ft/min

Total Flow of Stack Gas

Qa = As X Vs

Qa = 434,026.12 ACFM

Qs = Qa X 528/Ts X Ps/29.92

Qs = 314,774.16 SCFM

Qstd = Qs(1 - Bwo)

Qstd = 250,588.72 DSCFM

Vsstd = Qstd/As

Vsstd = 1887.93 ft/min

Percent Isokinetic

Is = Vmstd/(An X Time X Vsstd)

Is = 1.01

Particulate Concentration

Cs = (15.43)(Mn)/Vmstd

Cs = 0.0025

Particulate Mass Rate

Pmr = (Mn)(Qstd)(60)/(Vmstd)(453.6)

Pmr = 5.28

STACK TEST CALCULATIONS

Project:	GECC	Barom. Psr.:	29.5		Calculated
Project No:	39400684	Static Psr.:	-0.92	Ps:	29.432
Source:	Main Stack	Delta H @:	1.8345	As:	132.732
Run No.:	3	Gamma:	0.9946	An:	0.000179
Date:	5/30/2012	Pitot Coef.:	0.842		
Sample Volume:	43.265	Stack Dia.:	156	,in.	
Sample Time:	123.4	Nozzle Dia.:	0.181	,in.	
O2 Conc.:	7.5	H2O Gain:	229	,ml	
CO2 Conc.:	9.2	Part. Weight:	0.0008	,g	

PM2.5

TRAVERSE POINT NUMBER	VELOCITY DELTA P Actual	Sq. Root	DELTA H	DRY GAS METER TEMPERATURE	STACK TEMP.
1	0.66	0.812404	0.42	70	262
2	0.68	0.824621	0.42	70	265
3	0.68	0.824621	0.42	70	266
4	0.61	0.781025	0.42	70	265
5	0.52	0.72111	0.42	71	262
6	0.52	0.72111	0.42	71	260
7	0.61	0.781025	0.42	72	253
8	0.59	0.768115	0.42	73	254
9	0.62	0.787401	0.42	73	255
10	0.54	0.734847	0.42	73	254
11	0.41	0.640312	0.42	73	252
12	0.41	0.640312	0.42	74	251
13	0.68	0.824621	0.42	74	256
14	0.73	0.8544	0.42	73	257
15	0.75	0.866025	0.42	73	259
16	0.63	0.793725	0.42	73	255
17	0.58	0.761577	0.42	74	251
18	0.60	0.774597	0.42	74	250
19	0.78	0.883176	0.42	74	244
20	0.84	0.916515	0.42	74	246
21	0.82	0.905539	0.42	74	248
22	0.78	0.883176	0.42	73	259
23	0.83	0.911043	0.42	74	263
24	0.80	0.894427	0.42	74	261
AVERAGE	0.65291667	0.804405	0.42	72.66667	256.1667

TEST LAB DATA SHEET

PROJECT:	GECC	PROJECT NO.:	39400684.00001
SOURCE:	Main Stack	TEST DATE:	5/30/2012
TRAIN I.D.	201A	TEST NO.:	3
COLLECTED BY:	MSM		

CONDENSATION

IMPINGER NO.	INITIAL VOL.,ml/g	FINAL VOL., ml/g	NET GAIN, ml/g
1	358.3	360.2	1.9
2	598.7	787.5	188.8
3	734.5	760.0	25.5
4	888.0	900.8	12.8
5			0.0
6			0.0
7			0.0
TOTAL	2579.5	2808.5	229.0

PM2.5 PARTICULATE COLLECTED		
Initial Wt., g	Final Wt., g	Net Gain, g
8.6998	8.7006	0.0008

Project: GECC
Project No: 39400684
Source: Main Stack
Run No.: 3 **PM2.5**

Stack Sampling Calculations

Volume of Water Collected

Vwstd = (Vl0)(0.04707)

Vwstd = 10.78 cubic feet

Volume of Gas Metered, Standard Conditions

Vmstd = ((17.64) (Vm)(Pb + DeltaH/13.6)(gamma))/Tm

Vmstd = 42.083 cubic feet

Moisture Content

Bwo = Vwstd/(Vmstd + Vwstd)

Bwo = 0.20

Molecular Weight of the Dry Gas Stream

Md = (.44)(%CO2) + (.32)(%O2) + (.28)(%CO +%N2)

Md = 29.8

Molecular Weight of Stack Gas

Ms = (Md(1-Bwo) + 18(bwo)

Ms = 27.4

Velocity of Stack Gas

Vs = 174 Cp (DeltaP sq.rt.)((Ts+459.6) X 29.92 X 28.96/Ps/Ms)^.5

Vs = 3,269.9 ft/min

Total Flow of Stack Gas

Qa = As X Vs

Qa = 434,026.12 ACFM

Qs = Qa X 528/Ts X Ps/29.92

Qs = 314,774.16 SCFM

Qstd = Qs(1 - Bwo)

Qstd = 250,588.72 DSCFM

Vsstd = Qstd/As

Vsstd = 1887.93 ft/min

Percent Isokinetic

Is = Vmstd/(An X Time X Vsstd)

Is = 1.01

Particulate Concentration

Cs = (15.43)(Mn)/Vmstd

Cs = 0.0003

Particulate Mass Rate

Pmr = (Mn)(Qstd)(60)/(Vmstd)(453.6)

Pmr = 0.63

STACK TEST CALCULATIONS

Project:	GECC	Barom. Psr.:	29.5		Calculated
Project No:	39400684	Static Psr.:	-0.92	Ps:	29.432
Source:	Main Stack	Delta H @:	1.8345	As:	132.732
Run No.:	3	Gamma:	0.9946	An:	0.000179
Date:	5/30/2012	Pitot Coef.:	0.842		
Sample Volume:	43.265	Stack Dia.:	156 ,in.		
Sample Time:	123.4	Nozzle Dia.:	0.181 ,in.		
O2 Conc.:	7.5	H2O Gain:	229 ,ml		
CO2 Conc.:	9.2	Part. Weight:	0.0011 ,g		

PM10

TRAVERSE POINT NUMBER	VELOCITY DELTA P Actual	Sq. Root	DELTA H	DRY GAS METER TEMPERATURE	STACK TEMP.
1	0.66	0.812404	0.42	70	262
2	0.68	0.824621	0.42	70	265
3	0.68	0.824621	0.42	70	266
4	0.61	0.781025	0.42	70	265
5	0.52	0.72111	0.42	71	262
6	0.52	0.72111	0.42	71	260
7	0.61	0.781025	0.42	72	253
8	0.59	0.768115	0.42	73	254
9	0.62	0.787401	0.42	73	255
10	0.54	0.734847	0.42	73	254
11	0.41	0.640312	0.42	73	252
12	0.41	0.640312	0.42	74	251
13	0.68	0.824621	0.42	74	256
14	0.73	0.8544	0.42	73	257
15	0.75	0.866025	0.42	73	259
16	0.63	0.793725	0.42	73	255
17	0.58	0.761577	0.42	74	251
18	0.60	0.774597	0.42	74	250
19	0.78	0.883176	0.42	74	244
20	0.84	0.916515	0.42	74	246
21	0.82	0.905539	0.42	74	248
22	0.78	0.883176	0.42	73	259
23	0.83	0.911043	0.42	74	263
24	0.80	0.894427	0.42	74	261
AVERAGE	0.65291667	0.804405	0.42	72.66667	256.1667

URS

TEST LAB DATA SHEET

PROJECT:	GECC	PROJECT NO.:	39400684.00001
SOURCE:	Main Stack	TEST DATE:	7/15/2010
TRAIN I.D.	201A	TEST NO.:	3
COLLECTED BY:	MSM		

CONDENSATION

IMPINGER NO.	INITIAL VOL.,ml/g	FINAL VOL., ml/g	NET GAIN, ml/g
1	358.3	360.2	1.9
2	598.7	787.5	188.8
3	734.5	760.0	25.5
4	888.0	900.8	12.8
5			0.0
6			0.0
7			0.0
TOTAL	2579.5	2808.5	229.0

PM10 PARTICULATE COLLECTED		
Initial Wt., g	Final Wt., g	Net Gain, g
8.7657	8.7668	0.0011

Project: GECC
Project No: 39400684
Source: Main Stack
Run No.: 3 **PM10**

Stack Sampling Calculations

Volume of Water Collected

Vwstd = (Vl0)(0.04707)

Vwstd = 10.78 cubic feet

Volume of Gas Metered, Standard Conditions

Vmstd = ((17.64) (Vm)(Pb + DeltaH/13.6)(gamma))/Tm

Vmstd = 42.083 cubic feet

Moisture Content

Bwo = Vwstd/(Vmstd + Vwstd)

Bwo = 0.20

Molecular Weight of the Dry Gas Stream

Md = (.44)(%CO2) + (.32)(%O2) + (.28)(%CO +%N2)

Md = 29.8

Molecular Weight of Stack Gas

Ms = (Md(1-Bwo) + 18(bwo)

Ms = 27.4

Velocity of Stack Gas

Vs = 174 Cp (DeltaP sq.rt.)((Ts+459.6) X 29.92 X 28.96/Ps/Ms)^.5

Vs = 3,269.9 ft/min

Total Flow of Stack Gas

Qa = As X Vs

Qa = 434,026.12 ACFM

Qs = Qa X 528/Ts X Ps/29.92

Qs = 314,774.16 SCFM

Qstd = Qs(1 - Bwo)

Qstd = 250,588.72 DSCFM

Vsstd = Qstd/As

Vsstd = 1887.93 ft/min

Percent Isokinetic

Is = Vmstd/(An X Time X Vsstd)

Is = 1.01

Particulate Concentration

Cs = (15.43)(Mn)/Vmstd

Cs = 0.0004

Particulate Mass Rate

Pmr = (Mn)(Qstd)(60)/(Vmstd)(453.6)

Pmr = 0.87

Method 202

Lab Report

URS Corp. - Oak Ridge

1093 Commerce Park Dr, Suite 100
Oak Ridge, TN 37830

GECC – Main Stack

Client # 39400684.00001

Analytical Report
(0612-39)

EPA Method 202

Condensable Particulate Matter

Enthalpy Analytical, Inc.

Phone: (919) 850 - 4392 / Fax: (919) 850 - 9012 / www.enthalpy.com
800-1 Capitola Drive Durham, NC 27713-4385

I certify that to the best of my knowledge all analytical data presented in this report:

- Have been checked for completeness
- Are accurate, error-free, and legible
- Have been conducted in accordance with approved protocol, and that all deviations and analytical problems are summarized in the appropriate narrative(s)

This analytical report was prepared in Portable Document Format (.PDF) and contains 15 pages.

Michael Steven Schapira

QA Review Performed by: Michael Steven Schapira

Report Issued: 6/19/12

Summary of Results

Company	URS Corp - Oak Ridge
Analyst	KTH
Parameters	EPA Method 202

Client #	39400684.00001
Job #	0612-39
# Samples	3 Samples + Blanks

Compound	Sample ID / Condensible Particulate Matter (CPM) Weight (mg)		
	Run 1	***Run 2***	***Run 3***
Net Organic Catch	6.6	7.5	8.9
Corrected Inorganic	4.6	6.2	1.8
TB Corrected CPM	9.2	11.7	8.7
	Train Blank		
Organic Catch	4.9	If Train Blank CPM is >2.0 mg,	
Inorganic Catch	2.0	then sample correction is 2.0 mg.	
CPM	6.9		

Results

Company	URS Corp - Oak Ridge
Analyst	KTH
Parameters	EPA Method 202

Client #	39400684.00001
Job #	0612-39
# Samples	3 Samples + Blanks

Analysis of Condensible Particulate Recovery

Sample ID Number	Train Blank		Run 1		Run 2		Run 3	
Organic								
Beaker Number	*7718*		*7715*		*7716*		*7717*	
Initial Hexane/Acetone Volume, mL	118		102		128		120	
Lab Hexane Volume, mL	165	Dates	165	Dates	165	Dates	165	Dates
Final Weight, g	2.2144	6/14/12 5P	2.2182	6/14/12 5P	2.2228	6/14/12 5P	2.2204	6/14/12 5P
Reweigh, Final, g	2.2144	6/15/12 12P	2.2181	6/15/12 12P	2.2229	6/15/12 12P	2.2203	6/15/12 12P
Beaker Tare, g	2.2095	6/6/12	2.2115	6/6/12	2.2154	6/6/12	2.2115	6/6/12
Net Organic Catch, mg	4.9		6.6		7.5		8.9	
Inorganic								
Beaker Number	*7826*	Dates	*7823*	Dates	*7824*	Dates	*7825*	Dates
Final Weight, g	2.2185	6/14/12 5P	2.2204	6/14/12 5P	2.2365	6/14/12 5P	2.2222	6/14/12 5P
Reweigh, Final, g	2.2186	6/15/12 12P	2.2205	6/15/12 12P	2.2366	6/15/12 12P	2.2223	6/15/12 12P
Beaker Tare, g	2.2165	6/8/12	2.2136	6/8/12	2.2272	6/8/12	2.2167	6/8/12
Sample H2O volume, mL	120		155		190		185	
Added H2O, Filter Extraction, mL	75.0		75.0		75.0		75.0	
Removed Pre-aliquot, mL	0.5		0.5		0.5		0.5	
Pre-aliquot CF	1.003		1.002		1.002		1.002	
Resuspended Volume, mL	100		100		100		100	
Removed Post-aliquot, mL	0.5		0.5		0.5		0.5	
Post-aliquot CF	1.01		1.01		1.01		1.01	
Net Inorganic, mg	2.1		6.9		9.4		5.6	
Ammonium Correction, mg	0.1		2.3		3.2		3.8	
Corrected Inorganic, mg	2.0		4.6		6.2		1.8	
Condensible Particulate Matter, mg	6.9		11.2		13.7		10.7	
TB Corrected CPM, mg			9.2		11.7		8.7	

In-House Blank Analyses

Type Blank	Hexane		Type Blank	H2O Blank		Type Blank	Acetone	
Beaker Number	*7719*	Dates	Beaker Number	*7827*	Dates	Beaker Number	*7720*	Dates
Dry Residue Weight, g	2.2326	6/14/12	Dry Residue Weight, g	2.2218	6/14/12	Dry Residue Weight, g	2.2345	6/14/12
Reweigh, Final, g	2.2326	6/15/12	Reweigh, Final, g	2.2219	6/15/12	Reweigh, Final, g	2.2346	6/15/12
Tare weight, g	2.2263	6/6/12	Tare weight, g	2.2216	6/8/12	Tare weight, g	2.2335	6/6/12
Hexane Residue, g	0.0063		Water Residue, g	0.0003		Acetone Residue, g	0.0011	
Hexane Volume, mL	225		Water Volume, mL	250		Acetone Volume, mL	200	
Max. Hexane Residue, g	0.0001		Max. Water Residue, g	0.0003		Max. Acetone Residue, g	0.0002	

Company	URS Corp - Oak Ridge
Analyst	KTH
Parameters	EPA Method 202

Client #	39400684.00001
Job #	0612-39
# Samples	3 Samples + Blanks

MDL 0.09 (mg Ammonium)
MDL 0.26 (mg Sulfate)
Blank titrant amount (Vtb) 0.05
NH4OH normality 0.1

Lot # Sigma Aldrich 318620

Sample ID	Volume Resuspended (mL)	Titration Aliquot Vol (mL)	NH_4OH Titration Vol (mL)	Aliquot Factor (mL rec'd/aliq mL)	SO4 Catch (mg)	Ammonium equivalent (mg)
Train Blank	100	99.5	0.11	1.01	0.29	0.10
Run 1	100	99.5	1.42	1.01	6.61	2.34
Run 2	100	99.5	1.91	1.01	8.98	3.18
Run 3	100	99.5	2.28	1.01	10.77	3.82

Narrative Summary

Enthalpy Analytical Narrative Summary

Company	URS Corp – Oak Ridge
Analyst	KTH
Parameters	EPA Method 202

Client #	39400684.00001
Job #	0612-39
# Samples	3 Runs & 1 Train Blank

Custody

Lindsey Chatterton of Enthalpy Analytical, Inc. received the samples on 6/5/12 and 6/7/12 after being relinquished by URS Corporation – Oak Ridge. The samples were received at ambient temperature and were in good condition. Prior to, during, and after analysis, the samples were kept under lock with access only to authorized personnel by Enthalpy Analytical, Inc.

Analysis

The samples were analyzed for condensable particulate matter using the analytical procedures in EPA Method 202, Dry Impinger Method for Determining Condensible Particulate Emissions from Stationary Sources.

All sample fractions were weighed on Balance 8 (Sartorius Model ME 5-F, Serial # 23104965) certified by Mettler Toledo through July 30, 2012.

QC Notes

Acetone, hexane, and water reagent blanks were not received with these samples.

The method specifies blank corrections are accomplished by subtracting the particulate mass determined in the 'Field Train Blank' or 2 mg (whichever is less) from the sample weight. A train blank was received and analyzed with these samples, and was used to make the appropriate Train Blank correction to the sample results.

The inorganic results for the samples were corrected for the ammonium ions used to precipitate the sulfate, per the formula in the Method (Section 12.2.1).

Reporting Notes

Gravimetric analyses are considered to be accurate to ±0.5 mg. Therefore, negative catch weights between 0 and –0.5 mg are presented without investigation. Negative catch weights less than -0.5 mg are investigated. There were no negative catch weights in this project.

These analyses met the requirements of the NELAC Standard. Any deviations from the requirements of the reference method and/or the NELAC Standard have been previously noted in this narrative.

The results presented in this report are representative of the samples as provided to the laboratory.

General Reporting Notes

The following are general reporting notes that are applicable to all Enthalpy Analytical, Inc. data reports, unless specifically noted otherwise.

- The acronym ***MDL*** represents the Minimum Detection Limit. Below this value the laboratory cannot determine the presence of the analyte of interest reliably.
- The acronym ***LOQ*** represents the Limit of Quantification. Below this value the laboratory cannot quantitate the analyte of interest within the criteria of the method.
- The acronym ***ND*** following a value indicates a non-detect or analytical result below the MDL.
- The letter ***J*** following a value indicates an analytical result between the MDL and the LOQ. A J flag indicates that the laboratory can positively identify the analyte of interest as present, but the value should be considered an estimate.
- The letter ***E*** following a value indicates an analytical result exceeding 100% of the highest calibration point. The associated value should be considered as an estimate.
- The acronym ***DF*** represents Dilution Factor. This number represents dilution of the sample during the preparation and/or analysis process. The analytical result taken from a laboratory instrument is multiplied by the DF to determine the final undiluted sample results.
- The addition of ***MS*** to the Sample ID represents a Matrix Spike. An aliquot of an actual sample is spiked with a known amount of analyte so that a percent recovery value can be determined. This shows what effect the sample matrix may have on the target analyte, i.e. whether or not anything in the sample matrix interferes with the analysis of the analyte(s).
- The addition of ***MSD*** to the Sample ID represents a Matrix Spike Duplicate. Prepared in the same manner as an MS, the use of duplicate matrix spikes allows further confirmation of laboratory quality by showing the consistency of results gained by performing the same steps multiple times.
- The addition of ***LD*** to the Sample ID represents a Laboratory Duplicate. The analyst prepares an additional aliquot of sample for testing and the results of the duplicate analysis are compared to the initial result. The result should have a difference value of within 10% of the initial result (if the results of the original analysis are greater than the LOQ).
- The addition of ***AD*** to the Sample ID represents an Alternate Dilution. The analyst prepares an additional aliquot at a different dilution factor (usually double the initial factor). This analysis helps confirm that no additional compound is present and coeluting or sharing absorbance with the analyte of interest, as they would have a different response/absorbance than the analyte of interest.
- The Sample ID ***LCS*** represents a Laboratory Control Sample. Clean matrix, similar to the client sample matrix, prepared and analyzed by the laboratory using the same reagents, spiking standards and procedures used for the client samples. The LCS is used to assess the control of the laboratory's analytical system. Whenever spikes are prepared for our client projects, two extra spikes are prepared. The extras (randomly chosen) are labeled with the associated project number and kept in-house at the appropriate temperature conditions. When the project samples are received for analysis, the LCSs are analyzed to confirm that the analyte could be recovered from the media, separate from the samples which were used on the project and which may have been affected by source matrix, sample collection and/or sample transport.

General Reporting Notes

(continued)

- **Significant Figures**: Where the reported value is much greater than unity (1.00) in the units expressed, the number is rounded to a whole number of units, rather than to 3 significant figures. For example, a value of 10,456.45 ug catch is rounded to 10,456 ug. There are five significant digits displayed, but no confidence should be placed on more than two significant digits.
- **Manual Integration**: The data systems used for processing will flag manually integrated peaks with an "M". There are several reasons a peak may be manually integrated. These reasons will be identified by the following two letter designations. The peak was ***not integrated*** by the software **"NI"**, the peak was ***integrated incorrectly*** by the software **"II"** or the ***wrong peak*** was integrated by the software **"WP"**. These codes will accompany the analyst's manual integration stamp placed next to the compound name.

Sample Custody

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Project Name: GECC
Project Number: 39400684.00001
Test Location: Main Stack

URS Project Manager: Michael Mowery
Purchase Order Number: TBD
Required Report Date: Standard Turnaround

Sample Shipment Date: 6/4/2012
Laboratory Destination: Enthalpy Analytical, Inc.
Laboratory Contact: Brian Tyler
Project Contact/Phone:
Carrier Waybill No.: FedEx

Bill To: URS Corp.
1093 Commerce Park Dr.
Oak Ridge, TN 37830

Report To: Michael Mowery
URS Corp.
1093 Commerce Park Dr.
Oak Ridge, TN 37830

Sample Number	Sample Type	Date Collected	Sample Matrix	Requested Testing Program
RB	(1) Acetone - Reagent Blank	05/18/10	Liquid	Reagent Blank - Analyze as per EPA Method 202.
RB	Hexane - Reagent Blank	05/18/10	Liquid	
RB	Teflon Filter — DNR 4/5/12	05/18/10	Filter	
RB	Distilled Water — DNR 4/5/12	05/18/10	Liquid	
Run 1	Impinger Water	05/18/10	Liquid	Test Run 1 - Analyze as per EPA Method 202.
Run 1	(1) Acetone Rinse	05/18/10	Liquid	
Run 1	Hexane Rinse	05/18/10	Liquid	
Run 1	Teflon Filter	05/18/10	Filter	
Run 2	Impinger Water	05/18/10	Liquid	Test Run 2 - Analyze as per EPA Method 202.
Run 2	(1) Acetone Rinse	05/18/10	Liquid	
Run 2	Hexane Rinse	05/18/10	Liquid	
Run 2	Teflon Filter	05/18/10	Filter	
Run 3	Impinger Water	05/18/10	Liquid	Test Run 3 - Analyze as per EPA Method 202.
Run 3	(1) Acetone Rinse	05/18/10	Liquid	
Run 3	Hexane Rinse	05/18/10	Liquid	
Run 3	Teflon Filter	5/18/10	Filter	

TURNAROUND TIME REQUIRED Normal: X Rush:

POSSIBLE HAZARD IDENTIFICATION:
Nonhazard: X
Highly Toxic:
Flammable:
Radiological:

Level of QC Required: Standard

SAMPLE DISPOSAL: Return to Client: Disposal By Lab: X

1. Relinquished by: Michael Mowery Signature/Affiliation: Michael Mowery / URS	Date: 6/1/2012 Time: 13:00	1. Received by Signature/Affiliation:	Date: 6/5/12 Time: 11:00
2. Relinquished by Signature/Affiliation:	Date: Time:	2. Received by Signature/Affiliation:	Date: Time:
3. Relinquished by Signature/Affiliation:	Date: Time:	3. Received by Signature/Affiliation:	Date: Time:

Temp=Ambient

Comments: (1) Acetone & Hexane Rinses are combined

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Project Name: GECC
Project Number: 39400684.00001
Test Location: Main Stack

URS Project Manager: Michael Mowery
Purchase Order Number: TBD
Required Report Date: Standard Turnaround

Sample Shipment Date: 6/6/2012
Laboratory Destination: Enthalpy Analytical, Inc.
Laboratory Contact: Brian Tyler
Project Contact/Phone:
Carrier Waybill No.: FedEx

Bill To: URS Corp.
1093 Commerce Park Dr.
Oak Ridge, TN 37830

Report To: Michael Mowery
URS Corp.
1093 Commerce Park Dr.
Oak Ridge, TN 37830

Sample Number	Sample Type	Date Collected	Sample Matrix	Requested Testing Program
RB	Teflon Filter	05/18/10	Filter	Reagent Blank - Analyze as per EPA Method 202.
RB	Distilled Water	05/18/10	Liquid	

TURNAROUND TIME REQUIRED Normal: X Rush:

POSSIBLE HAZARD IDENTIFICATION:
Nonhazard: X
Highly Toxic:
Flammable:
Radiological:

Level of QC Required: Standard

SAMPLE DISPOSAL: Return to Client Disposal By Lab X

1. Relinquished by: Michael Mowery	Date: 6/1/2012	1. Received by	Date: 6/7/12
Signature/Affiliation: Michael Mowery / URS	Time: 13:00	Signature/Affiliation:	Time: 9:25
2. Relinquished by	Date:	2. Received by	Date:
Signature/Affiliation:	Time:	Signature/Affiliation:	Time:
3. Relinquished by	Date:	3. Received by	Date:
Signature/Affiliation:	Time:	Signature/Affiliation:	Time:

Comments:

Temp = Ambient

This Is The Last Page Of This Report.

Appendix C

CEM Test Data

CEM Operator Field Notes

URS

CALC. NO. _____

CALCULATION SHEET

SIGNATURE _____ DATE 5/30/2012 CHECKED _____ DATE _____

PROJECT _____ JOB NO. _____

SUBJECT GECC 2012 Compliance SHEET 2 OF _____ SHEETS

Start Run 2 @ 13:55 - 15:54

Bias

	Time	O_2	CO_2	NOx	CO	THC
Zero	15:59	0.5	0.1	0.4		-1.0
O_2/CO_2	16:02	9.9	9.8		0.5	
CO	16:09				49.5	
NOx	16:14			43.3		
THC	16:05					24.1

Stratification Test

Point 1	16:52 - 16:54	26" (16.7%)
Point 2	16:56 - 16:58	78" (50%)
Point 3	17:03 - 17:05	26" opposite side of stack (83.3%)

Response	up	down	up	down	up	down
O_2	40:31	39:29	40.54	39.83	40.15	40.07
CO_2	41.23	41:40	41.49	40.76	40.92	40.15
~~NOx~~ THC	12.52	13.06	12.64	12.89	12.41	12.23
CO	1.06.35	1.04.92	1.05.75	1.05.32	1.05.41	1.05.62
~~THC~~ NOx	1.59.30	1.58.68	1.58.88	1.58.21	1.58.55	1.58.35

Start Run 3 @ 19:02 - ~~21:01~~ (paused testing Hot Car) 20:40

Restart @ 23:28 - 23:57

Bias

	Time	O_2	CO_2	NOx	CO	THC
Zero	23:54	0.4	0.1			-1.1
O_2/CO_2	23:57	9.9	9.8	0.4	0.3	
CO	00:04				50.2	
NOx	00:08			45.6		
THC	00:01					25.5

URS

CALC. NO. _____

CALCULATION SHEET

SIGNATURE _____ DATE 5/30/2012 CHECKED _____ DATE _____

PROJECT _____ JOB NO. _____

SUBJECT GECC 2012 Compliance SHEET 1 OF _____ SHEETS

Direct cal

	Time	O_2	CO_2	NOx	CO	~~THC~~
Zero	09:31	0.0	0.1	0.1	0.1	
O_2/CO_2	09:45	20.6	20.8	0.0	0.0	
O_2/CO_2	09:49	10.1	9.8			
CO	~~09:55~~ 10:17				89.7	
CO	~~10:02~~				~~52.2~~ 50.7	
NOx	10:08			99.1		
NOx	10:14			44.9		

System cal

	Time	O_2	CO_2	NOx	CO	THC
Zero	10:22	0.2	0.1			
O_2/CO_2	10:27	9.9	9.8	0.3	0.5	-0.6
CO	10:30				49.7	
NOx	10:34			44.6		
THC 89.9	10:36					90.2
THC 50.4	10:38					49.7
THC ~~25.~~	10:40					24.2

Start Run 1 @ 10:50 - 12:49

Jum flamed out at 12:44

Bias

	Time	O_2	CO_2	NOx	CO	THC
Zero	12:53	0.7	0.1	0.4		-0.7
O_2/CO_2	12:56	10.0	9.7		0.9	
CO	13:01				49.8	
NOx	13:06			43.4		
THC	12:58					24.7

CEM Response Time Test

THC Analyzer Response Check

Stack Stratification Check

NO_x Converter Check

3-Point Stratification Check
Test Location

Stack Diameter	(in)	120
Port Length	(in)	6
3 pts.		
Pts.	(in)	(%)
1	26.0	16.7
2	66.0	50.0
3	106.0	83.3

Pts.	NO_x Conc.	THC Conc.	CO Conc.	CO_2 Conc.	O_2 Conc.
1	47.5667	-0.90	0.67	10.43	5.67
2	49.2667	-0.90	0.80	10.37	5.70
3	50.5667	-0.93	0.83	10.33	5.73
avg.	49.1333	-0.9111	0.76667	10.3778	5.7

Pts.	NO_x		THC		CO		CO_2		O_2	
	% Diff	Abs Diff	% Diff	Abs Diff	% Diff	Abs Diff	% Diff	Abs Diff	% Diff	Abs Diff
1	-3.1886	1.56667	-1.2195	0.0	-13.043	0.1	0.53533	-0.1	-0.5848	0.0
2	0.27137	-0.1333	-1.2195	0.0	4.34783	-0.0333	-0.1071	0.0	0	0.0
3	2.91723	-1.4333	2.43902	0.0	8.69565	-0.0667	-0.4283	0.0	0.5848	0.0

5/30/2012	16:52	47.4	-0.9	0.7	10.4	5.6
5/30/2012	16:53	48.3	-0.9	0.7	10.5	5.6
5/30/2012	16:54	47	-0.9	0.6	10.4	5.8
5/30/2012	16:56	48.9	-0.9	0.9	10.4	5.6
5/30/2012	16:57	48.5	-0.9	0.7	10.4	5.7
5/30/2012	16:58	50.4	-0.9	0.8	10.3	5.8
5/30/2012	17:03	50.4	-0.9	0.7	10.3	5.8
5/30/2012	17:04	50.8	-1	0.9	10.3	5.7
5/30/2012	17:05	50.5	-0.9	0.9	10.4	5.7

Method 25A Calibration

	Cal. Gas Value	Analyzer Response
High check	89.90	90.20
Zero check	0	-0.6

Slope	1.010011				
y-Intercept	-0.6				
				Cal Gas Value	5%
Predicted	24.681		**TRUE**	25.03	1.2515
	50.335			50.43	2.5215
Analyzer Response	24.20				
	49.70				
difference	0.4806				
	0.6349				
Cal ok?	**Yes**				
	Yes				

URS

CEM RESPONSE TIME TEST

Date of Test: May 30, 2012

Analyzer Type: O_2

Span Gas Concentration: 20.96

Analyzer Span Setting: 25 %

UPSCALE RESPONSE			
	Start	95% Response	Time (sec)
1	0.0	19.9	40.31
2	0.0	19.9	40.54
3	0.0	19.9	40.15
Average Upscale Response			40.33

DOWNSCALE RESPONSE			
	Start	95% Response	Time (sec)
1	19.9	1.0	39.29
2	19.9	1.0	39.83
3	19.9	1.0	40.07
Average Downscale Response			39.73

UPSCALE RESPONSE = Time required to reach 95% of stable reading shifting from stable zero to stack gas.

DOWNSCALE RESPONSE = Time required to reach 95% of stable reading shifting from stable high-level cal to stack gas.

RESPONSE TIME = The longer of the two mean times.

URS

CEM RESPONSE TIME TEST

Date of Test: May 30, 2012

Analyzer Type: CO_2

Span Gas Concentration: 20.69

Analyzer Span Setting: 25 %

UPSCALE RESPONSE			
	Start	95% Response	Time (sec)
1	0.0	19.7	41.23
2	0.0	19.7	41.49
3	0.0	19.7	40.92
Average Upscale Response			41.21

DOWNSCALE RESPONSE			
	Start	95% Response	Time (sec)
1	19.7	1.0	41.4
2	19.7	1.0	40.76
3	19.7	1.0	40.15
Average Downscale Response			40.77

UPSCALE RESPONSE = Time required to reach 95% of stable reading shifting from stable zero to stack gas.

DOWNSCALE RESPONSE = Time required to reach 95% of stable reading shifting from stable high-level cal to stack gas.

RESPONSE TIME = The longer of the two mean times.

URS

CEM RESPONSE TIME TEST

Date of Test: May 30, 2012

Analyzer Type: CO

Span Gas Concentration: 89.52

Analyzer Span Setting: 100 ppm

UPSCALE RESPONSE			
	Start	95% Response	Time (sec)
1	0.0	85.0	66.35
2	0.0	85.0	65.75
3	0.0	85.0	65.41
Average Upscale Response			65.84

DOWNSCALE RESPONSE			
	Start	95% Response	Time (sec)
1	85.0	4.5	64.92
2	85.0	4.5	65.32
3	85.0	4.5	65.62
Average Downscale Response			65.29

UPSCALE RESPONSE = Time required to reach 95% of stable reading shifting from stable zero to stack gas.

DOWNSCALE RESPONSE = Time required to reach 95% of stable reading shifting from stable high-level cal to stack gas.

RESPONSE TIME = The longer of the two mean times.

URS

CEM RESPONSE TIME TEST

Date of Test: May 30, 2012

Analyzer Type: NOx

Span Gas Concentration: 98.95

Analyzer Span Setting: 100 ppm

UPSCALE RESPONSE			
	Start	95% Response	Time (sec)
1	0.0	94.0	119.3
2	0.0	94.0	118.68
3	0.0	94.0	118.55
Average Upscale Response			118.84

DOWNSCALE RESPONSE			
	Start	95% Response	Time (sec)
1	94.0	4.9	118.68
2	94.0	4.9	118.21
3	94.0	4.9	118.35
Average Downscale Response			118.41

UPSCALE RESPONSE = Time required to reach 95% of stable reading shifting from stable zero to stack gas.

DOWNSCALE RESPONSE = Time required to reach 95% of stable reading shifting from stable high-level cal to stack gas.

RESPONSE TIME = The longer of the two mean times.

URS

CEM RESPONSE TIME TEST

Date of Test: May 30, 2012

Analyzer Type: THC

Span Gas Concentration: 89.9

Analyzer Span Setting: 100 ppm

UPSCALE RESPONSE			
	Start	95% Response	Time (sec)
1	0.0	85.4	12.52
2	0.0	85.4	12.64
3	0.0	85.4	12.41
Average Upscale Response			12.52

DOWNSCALE RESPONSE			
	Start	95% Response	Time (sec)
1	85.4	4.5	13.06
2	85.4	4.5	12.89
3	85.4	4.5	12.23
Average Downscale Response			12.73

UPSCALE RESPONSE = Time required to reach 95% of stable reading shifting from stable zero to stack gas.

DOWNSCALE RESPONSE = Time required to reach 95% of stable reading shifting from stable high-level cal to stack gas.

RESPONSE TIME = The longer of the two mean times.

NO_2-NO Converter Efficiency Test (NO_2 Cylinder Method)

Date:	5/30/2012	Location:	URS Trailer
Project:	Granite City	Technician:	Todd Gregg
Analyzer:	TECO	Operating Range:	0-100
Model:	42C		
S/N:	CC260561		

Cylinder Number	Cal Gas Concentration	NO_x Analyzer Response in Direct Cal Mode
CC26684	49.32	47.4

$$\text{Converter Efficiency} = \frac{C_{Dir}}{C_v} \times 100$$

Converter Efficiency = **96.1** % (Must be greater than or equal to 90 percent)

Procedures

1. Calibrate analyzer
2. Introduce a 40 to 60 ppmv NO_2 calibration gas cylinder to the analyzer in direct cal mode and record the NO_x response.
3. Calculate efficiency.

Current Date : 05/30/12
Current Time : 10:50

Daily Parameter Report - Minute Averages

NOx Converter Check

Logger Name : Datalogger 01
Logger Id : 01
Parameter : NOX
Units : PPM

Date	Time 001M	Minute 00	01	02	03	04	05	06	07	08	09
05/30/12	08:40	47.2	47.2	47.3	47.3	47.3	47.7	47.7	47.5	47.5	47.5
05/30/12	08:50	47.6									

Max	47.7
Min	47.2
Mean	47.4
Records	11

Status : '<' - Less than ##% Data, 'P' - Power Fail, 'D' - Disabled, 'T' - Out-of-Control, 'F' - Boiler Off-Line,
Flags : 'B' - Bad Status, 'C' - Calibration, 'M' - Maintenance, 'O' - Analog Overrange, 'U' - Analog Underrange,
'A' - Arithmetic Error, '+' - Maximum, '-' - Minimum, 'R' - Rate of Change, 'H' - High-High Alarm,
'L' - Low-Low Alarm, 'h' - High Alarm, 'l' - Low Alarm, 'J' - High Rate of Change, 'j' - Low Rate of Change,
'V' - DIS #1 Obs, 'W' - DIS #2 Obs, 'X' - DIS #3 Obs, 'Y' - DIS #4 Obs, 'Z' - DIS #5 Obs.

CEM Calibration & Test Data

Run 1

CEM CALIBRATIONS

PROJECT NAME	GECC Main Stack Compliance
PROJECT NUMBER	39400684.00001
DATE	May 30, 2012
RUN NUMBER	R1
START TIME	10:50 AM
STOP TIME	12:44 PM

ANALYZER SPAN	
CO	90
CO_2	21
O_2	21
NO_x	99
SO_2	
THC	90

		CALIBRATION ERROR			SYSTEM BIAS CHECK								
					PRETEST		POST TEST						
	GAS CYLINDER NUMBER	CAL. GAS VALUE (% or PPM)	ANALYZER RESPONSE (% or PPM)	CAL ERROR (% SPAN)	SYSTEM RESP.	SYS. BIAS (% SPAN)	SYSTEM RESP.	SYS. BIAS (% SPAN)	DRIFT (% SPAN)	IS CAL ERROR CHECK OK? (YES/NO)	IS PRETEST BIAS OK? (YES/NO)	IS POSTEST BIAS OK? (YES/NO)	IS SYSTEM DRIFT OK? (YES/NO)
CO zero	n/a	0.00	0.00	0.00	0.50	-0.56	0.90	-1.00	-0.45	YES	YES	YES	YES
CO mid	XC027692	50.27	50.70	-0.48	49.70	1.11	49.80	1.00	-0.11	YES	YES	YES	YES
CO hi	SG9197301	89.52	89.70	-0.20									
CO_2 zero	n/a	0.00	0.10	-0.48	0.10	0.00	0.10	0.00	0.00	YES	YES	YES	YES
CO_2 mid	CC286931	9.92	9.80	0.57	9.80	0.00	9.70	0.48	0.48	YES	YES	YES	YES
CO_2 hi	CC94024	20.69	20.80	-0.53									
O_2 zero	n/a	0.00	0.00	0.00	0.20	-0.95	0.70	-3.34	-2.39	YES	YES	YES	YES
O_2 mid	CC286931	10.03	10.10	-0.33	9.90	0.95	10.00	0.48	-0.48	YES	YES	YES	YES
O_2 hi	CC94024	20.96	20.60	1.72									
NO_x zero	n/a	0.00	0.00	0.00	0.30	-0.30	0.40	-0.40	-0.10	YES	YES	YES	YES
NO_x mid	SG9151860	44.91	44.90	0.01	44.60	0.30	43.40	1.52	1.21	YES	YES	YES	YES
NO_x hi	CC3911	98.95	99.10	-0.15									
THC zero	n/a	0.00	-0.60	0.67	-0.60	0.00	-0.70	0.11	0.11	YES	YES	YES	YES
THC mid	XC005711	50.43	49.70	0.81									
THC low	CC170826	25.03	24.20	0.92	24.20	0.00	24.70	-0.56	-0.56	YES	YES	YES	YES
THC hi	CC178781	89.90	90.20	-0.33									

Correction factors

CO	Avg. Conc	-	0.7	* 1.0248726
CO_2	Avg. Conc	-	0.1	* 1.0276684
O_2	Avg. Conc	-	0.45	* 1.0557895
NO_x	Avg. Conc	-	0.35	* 1.028866
THC	Avg. Conc	-	-0.65	* 0.9972112

Calibration error = ((cal. gas value - analyzer resp) / analyzer span) * 100: allowable error ± 2 % , ± 5 % for THC

System Bias = ((analyzer resp - system resp) / analyzer span) * 100: allowable error ± 5 %

Drift = ((pretest sys resp - post test sys resp) / analyzer span) * 100: allowable error ± 3 %

Sys Bias (pre and post) must be performed on each run: To determine Drift.
Use zero gas and either mid or hi cal gas, choose cal gas closest to measured stack concentration.

Drift must be performed every hour on THC

Calibration Error is performed only at start, unless allowable error parameters are exceeded.

Sun Coke Granite City CEM's Compliance Data

Compliance Test Run # 1

		Raw Data					Calibration Corrected Data						Flow Data	Mass Rates		
Date	Hour	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	THC (dry ppm)	(dscfm)	NOX (lb/hr)	CO (lb/hr)	THC (lb/hr)
5/30/2012	10:50	5.2	10.6	47.9	1.1	-0.6	5.10	10.12	47.54	0.38	0.05	0.04	231,524	78.91	0.39	0.06
5/30/2012	10:51	5.2	10.6	47.8	1	-0.4	5.10	10.12	47.44	0.28	0.25	0.20	231,524	78.74	0.29	0.31
5/30/2012	10:52	5.3	10.6	47.7	1.2	-0.6	5.20	10.12	47.34	0.48	0.05	0.04	231,524	78.58	0.49	0.06
5/30/2012	10:53	5.2	10.6	48.3	1.2	-0.7	5.10	10.12	47.94	0.48	-0.05	-0.04	231,524	79.57	0.49	-0.07
5/30/2012	10:54	5.2	10.6	47.6	1	-0.7	5.10	10.12	47.24	0.28	-0.05	-0.04	231,524	78.41	0.29	-0.07
5/30/2012	10:55	5.2	10.6	47.5	0.9	-0.3	5.10	10.12	47.14	0.18	0.35	0.27	231,524	78.25	0.18	0.44
5/30/2012	10:56	5.2	10.7	47.5	0.9	-0.7	5.10	10.22	47.14	0.18	-0.05	-0.04	231,524	78.25	0.18	-0.07
5/30/2012	10:57	5.2	10.7	47.4	1.2	-0.7	5.10	10.22	47.04	0.48	-0.05	-0.04	231,524	78.08	0.49	-0.07
5/30/2012	10:58	5.2	10.7	47.2	1.1	-0.7	5.10	10.22	46.84	0.38	-0.05	-0.04	231,524	77.75	0.39	-0.07
5/30/2012	10:59	5.2	10.6	47.3	1.1	-0.7	5.10	10.12	46.94	0.38	-0.05	-0.04	231,524	77.91	0.39	-0.07
5/30/2012	11:00	5.2	10.7	47.6	1	-0.8	5.10	10.22	47.24	0.28	-0.15	-0.12	231,524	78.41	0.29	-0.19
5/30/2012	11:01	5.2	10.7	47	1	-0.5	5.10	10.22	46.64	0.28	0.15	0.12	231,524	77.42	0.29	0.19
5/30/2012	11:02	5.2	10.7	47.2	1.1	-0.7	5.10	10.22	46.84	0.38	-0.05	-0.04	231,524	77.75	0.39	-0.07
5/30/2012	11:03	5.2	10.7	47	1	-0.7	5.10	10.22	46.64	0.28	-0.05	-0.04	231,524	77.42	0.29	-0.07
5/30/2012	11:04	5.2	10.7	47	0.9	-0.3	5.10	10.22	46.64	0.18	0.35	0.27	231,524	77.42	0.18	0.44
5/30/2012	11:05	5.2	10.6	47.4	0.8	-0.6	5.10	10.12	47.04	0.08	0.05	0.04	231,524	78.08	0.08	0.06
5/30/2012	11:06	5.2	10.7	47.4	0.8	-0.7	5.10	10.22	47.04	0.08	-0.05	-0.04	231,524	78.08	0.08	-0.07
5/30/2012	11:07	5.2	10.7	46.9	0.8	-0.7	5.10	10.22	46.54	0.08	-0.05	-0.04	231,524	77.25	0.08	-0.07
5/30/2012	11:08	5.3	10.7	46.9	0.9	-0.7	5.20	10.22	46.54	0.18	-0.05	-0.04	231,524	77.25	0.18	-0.07
5/30/2012	11:09	5.2	10.6	47.5	0.8	-0.7	5.10	10.12	47.14	0.08	-0.05	-0.04	231,524	78.25	0.08	-0.07
5/30/2012	11:10	5.2	10.7	46.9	0.8	-0.7	5.10	10.22	46.54	0.08	-0.05	-0.04	231,524	77.25	0.08	-0.07
5/30/2012	11:11	5.2	10.7	46.4	0.8	-0.7	5.10	10.22	46.04	0.08	-0.05	-0.04	231,524	76.42	0.08	-0.07
5/30/2012	11:12	5.2	10.7	46.4	0.8	-0.7	5.10	10.22	46.04	0.08	-0.05	-0.04	231,524	76.42	0.08	-0.07
5/30/2012	11:13	5.2	10.7	46.5	0.9	-0.7	5.10	10.22	46.14	0.18	-0.05	-0.04	231,524	76.59	0.18	-0.07
5/30/2012	11:14	5.2	10.7	46.6	0.9	-0.8	5.10	10.22	46.24	0.18	-0.15	-0.12	231,524	76.75	0.18	-0.19
5/30/2012	11:15	5.2	10.7	46.7	0.9	-0.5	5.10	10.22	46.34	0.18	0.15	0.12	231,524	76.92	0.18	0.19
5/30/2012	11:16	5.2	10.6	46.8	0.8	-0.7	5.10	10.12	46.44	0.08	-0.05	-0.04	231,524	77.09	0.08	-0.07
5/30/2012	11:17	5.2	10.6	47.3	1	-0.7	5.10	10.12	46.94	0.28	-0.05	-0.04	231,524	77.91	0.29	-0.07
5/30/2012	11:18	5.2	10.6	47.7	0.9	-0.8	5.10	10.12	47.34	0.18	-0.15	-0.12	231,524	78.58	0.18	-0.19
5/30/2012	11:19	5.2	10.7	47.9	0.9	-0.5	5.10	10.22	47.54	0.18	0.15	0.12	231,524	78.91	0.18	0.19
5/30/2012	11:20	5.1	10.7	47.8	0.9	-0.8	5.00	10.22	47.44	0.18	-0.15	-0.12	231,524	78.74	0.18	-0.19
5/30/2012	11:21	5.2	10.8	47.3	0.6	-0.4	5.10	10.32	46.94	-0.12	0.25	0.20	231,524	77.91	-0.12	0.31
5/30/2012	11:22	5.2	10.7	47	0.7	-0.7	5.10	10.22	46.64	-0.02	-0.05	-0.04	231,524	77.42	-0.02	-0.07
5/30/2012	11:23	5.2	10.7	47.2	0.7	-0.6	5.10	10.22	46.84	-0.02	0.05	0.04	231,524	77.75	-0.02	0.06
5/30/2012	11:24	5.2	10.7	47.1	0.7	-0.7	5.10	10.22	46.74	-0.02	-0.05	-0.04	231,524	77.58	-0.02	-0.07

Sun Coke Granite City CEM's Compliance Data

Compliance Test Run # 1

		Raw Data					Calibration Corrected Data						Flow Data	Mass Rates		
Date	Hour	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	THC (dry ppm)	(dscfm)	NOX (lb/hr)	CO (lb/hr)	THC (lb/hr)
5/30/2012	11:25	5.2	10.7	47	0.7	-0.8	5.10	10.22	46.64	-0.02	-0.15	-0.12	231,524	77.42	-0.02	-0.19
5/30/2012	11:26	5.1	10.7	46.1	0.7	-0.7	5.00	10.22	45.74	-0.02	-0.05	-0.04	231,524	75.92	-0.02	-0.07
5/30/2012	11:27	5.2	10.7	45.8	0.6	-0.7	5.10	10.22	45.44	-0.12	-0.05	-0.04	231,524	75.43	-0.12	-0.07
5/30/2012	11:28	5.3	10.7	45.1	0.9	-0.7	5.20	10.22	44.74	0.18	-0.05	-0.04	231,524	74.26	0.18	-0.07
5/30/2012	11:29	5.2	10.6	46.1	0.7	-0.7	5.10	10.12	45.74	-0.02	-0.05	-0.04	231,524	75.92	-0.02	-0.07
5/30/2012	11:30	5.1	10.7	45.8	0.6	-0.7	5.00	10.22	45.44	-0.12	-0.05	-0.04	231,524	75.43	-0.12	-0.07
5/30/2012	11:31	5.2	10.7	45.1	0.7	-0.7	5.10	10.22	44.74	-0.02	-0.05	-0.04	231,524	74.26	-0.02	-0.07
5/30/2012	11:32	5.3	10.7	44	0.8	-0.8	5.20	10.22	43.64	0.08	-0.15	-0.12	231,524	72.44	0.08	-0.19
5/30/2012	11:33	5.2	10.6	44.4	0.9	-0.8	5.10	10.12	44.04	0.18	-0.15	-0.12	231,524	73.10	0.18	-0.19
5/30/2012	11:34	5.1	10.7	45	0.8	-0.8	5.00	10.22	44.64	0.08	-0.15	-0.12	231,524	74.10	0.08	-0.19
5/30/2012	11:35	5.2	10.7	44.4	0.7	-0.8	5.10	10.22	44.04	-0.02	-0.15	-0.12	231,524	73.10	-0.02	-0.19
5/30/2012	11:36	5.2	10.7	43.6	0.6	-0.8	5.10	10.22	43.24	-0.12	-0.15	-0.12	231,524	71.77	-0.12	-0.19
5/30/2012	11:37	5.2	10.7	44	0.9	-0.7	5.10	10.22	43.64	0.18	-0.05	-0.04	231,524	72.44	0.18	-0.07
5/30/2012	11:38	5.2	10.7	43.8	0.8	-0.8	5.10	10.22	43.44	0.08	-0.15	-0.12	231,524	72.11	0.08	-0.19
5/30/2012	11:39	5.1	10.7	43.7	0.6	-0.8	5.00	10.22	43.34	-0.12	-0.15	-0.12	231,524	71.94	-0.12	-0.19
5/30/2012	11:40	5.2	10.7	43.8	0.7	-0.6	5.10	10.22	43.44	-0.02	0.05	0.04	231,524	72.11	-0.02	0.06
5/30/2012	11:41	5.2	10.7	43.7	0.8	-0.8	5.10	10.22	43.34	0.08	-0.15	-0.12	231,524	71.94	0.08	-0.19
5/30/2012	11:42	5.3	10.7	43.7	0.8	-0.8	5.20	10.22	43.34	0.08	-0.15	-0.12	231,524	71.94	0.08	-0.19
5/30/2012	11:43	5.2	10.7	44.2	1	-0.8	5.10	10.22	43.84	0.28	-0.15	-0.12	231,524	72.77	0.29	-0.19
5/30/2012	11:44	5.1	10.7	44.2	0.8	-0.8	5.00	10.22	43.84	0.08	-0.15	-0.12	231,524	72.77	0.08	-0.19
5/30/2012	11:45	5.2	10.7	43.5	0.9	-0.8	5.10	10.22	43.14	0.18	-0.15	-0.12	231,524	71.61	0.18	-0.19
5/30/2012	11:46	5.2	10.7	43.4	0.7	-0.8	5.10	10.22	43.04	-0.02	-0.15	-0.12	231,524	71.44	-0.02	-0.19
5/30/2012	11:47	5.2	10.7	44.1	0.5	-0.8	5.10	10.22	43.74	-0.22	-0.15	-0.12	231,524	72.60	-0.22	-0.19
5/30/2012	11:48	5.1	10.7	44.7	0.8	-0.8	5.00	10.22	44.34	0.08	-0.15	-0.12	231,524	73.60	0.08	-0.19
5/30/2012	11:49	5.1	10.8	45.3	0.8	0	5.00	10.32	44.94	0.08	0.65	0.51	231,524	74.60	0.08	0.82
5/30/2012	11:50	5.2	10.8	45.5	0.9	-0.7	5.10	10.32	45.14	0.18	-0.05	-0.04	231,524	74.93	0.18	-0.07
5/30/2012	11:51	5.3	10.7	45.6	1.2	-0.8	5.20	10.22	45.24	0.48	-0.15	-0.12	231,524	75.09	0.49	-0.19
5/30/2012	11:52	5.1	10.7	47.3	1.1	-0.7	5.00	10.22	46.94	0.38	-0.05	-0.04	231,524	77.91	0.39	-0.07
5/30/2012	11:53	5.1	10.7	48.3	0.9	-0.7	5.00	10.22	47.94	0.18	-0.05	-0.04	231,524	79.57	0.18	-0.07
5/30/2012	11:54	5.1	10.7	47.3	0.9	-0.8	5.00	10.22	46.94	0.18	-0.15	-0.12	231,524	77.91	0.18	-0.19
5/30/2012	11:55	5.1	10.7	47.3	0.9	-0.8	5.00	10.22	46.94	0.18	-0.15	-0.12	231,524	77.91	0.18	-0.19
5/30/2012	11:56	5.1	10.8	47.3	0.8	-0.7	5.00	10.32	46.94	0.08	-0.05	-0.04	231,524	77.91	0.08	-0.07
5/30/2012	11:57	5.1	10.8	46.7	0.7	-0.8	5.00	10.32	46.34	-0.02	-0.15	-0.12	231,524	76.92	-0.02	-0.19
5/30/2012	11:58	5.1	10.8	46.2	0.6	-0.8	5.00	10.32	45.84	-0.12	-0.15	-0.12	231,524	76.09	-0.12	-0.19
5/30/2012	11:59	5.2	10.7	46.5	0.9	-0.8	5.10	10.22	46.14	0.18	-0.15	-0.12	231,524	76.59	0.18	-0.19

Sun Coke Granite City CEM's Compliance Data

Compliance Test Run # 1

		Raw Data					Calibration Corrected Data						Flow Data	Mass Rates		
Date	Hour	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	THC (dry ppm)	(dscfm)	NOX (lb/hr)	CO (lb/hr)	THC (lb/hr)
5/30/2012	12:00	5.3	10.7	47.5	1.1	-0.6	5.20	10.22	47.14	0.38	0.05	0.04	231,524	78.25	0.39	0.06
5/30/2012	12:01	5.3	10.6	47.7	1.1	-0.8	5.20	10.12	47.34	0.38	-0.15	-0.12	231,524	78.58	0.39	-0.19
5/30/2012	12:02	5.2	10.7	47.8	0.9	-0.7	5.10	10.22	47.44	0.18	-0.05	-0.04	231,524	78.74	0.18	-0.07
5/30/2012	12:03	5.1	10.7	47.3	0.7	-0.8	5.00	10.22	46.94	-0.02	-0.15	-0.12	231,524	77.91	-0.02	-0.19
5/30/2012	12:04	5	10.8	46.6	0.7	-0.7	4.90	10.32	46.24	-0.02	-0.05	-0.04	231,524	76.75	-0.02	-0.07
5/30/2012	12:05	5.1	10.8	45.7	0.7	-0.8	5.00	10.32	45.34	-0.02	-0.15	-0.12	231,524	75.26	-0.02	-0.19
5/30/2012	12:06	5.1	10.8	45.5	0.7	-0.7	5.00	10.32	45.14	-0.02	-0.05	-0.04	231,524	74.93	-0.02	-0.07
5/30/2012	12:07	5.1	10.8	46	0.7	-0.8	5.00	10.32	45.64	-0.02	-0.15	-0.12	231,524	75.76	-0.02	-0.19
5/30/2012	12:08	5.1	10.8	46.1	0.9	-0.8	5.00	10.32	45.74	0.18	-0.15	-0.12	231,524	75.92	0.18	-0.19
5/30/2012	12:09	5.2	10.7	45.9	0.8	-0.8	5.10	10.22	45.54	0.08	-0.15	-0.12	231,524	75.59	0.08	-0.19
5/30/2012	12:10	5.2	10.7	46.5	0.8	-0.1	5.10	10.22	46.14	0.08	0.55	0.43	231,524	76.59	0.08	0.69
5/30/2012	12:11	5.2	10.7	46.8	0.9	-0.2	5.10	10.22	46.44	0.18	0.45	0.35	231,524	77.09	0.18	0.56
5/30/2012	12:12	5.1	10.7	46.6	0.6	-0.8	5.00	10.22	46.24	-0.12	-0.15	-0.12	231,524	76.75	-0.12	-0.19
5/30/2012	12:13	5.1	10.8	45.9	0.8	-0.7	5.00	10.32	45.54	0.08	-0.05	-0.04	231,524	75.59	0.08	-0.07
5/30/2012	12:14	5.2	10.7	45.5	0.8	-0.7	5.10	10.22	45.14	0.08	-0.05	-0.04	231,524	74.93	0.08	-0.07
5/30/2012	12:15	5.1	10.7	45.6	0.9	-0.8	5.00	10.22	45.24	0.18	-0.15	-0.12	231,524	75.09	0.18	-0.19
5/30/2012	12:16	5	10.8	46.2	1	-0.5	4.90	10.32	45.84	0.28	0.15	0.12	231,524	76.09	0.29	0.19
5/30/2012	12:17	4.9	10.9	45.2	0.8	-0.8	4.80	10.42	44.84	0.08	-0.15	-0.12	231,524	74.43	0.08	-0.19
5/30/2012	12:18	4.9	10.9	43.9	0.8	-0.8	4.80	10.42	43.54	0.08	-0.15	-0.12	231,524	72.27	0.08	-0.19
5/30/2012	12:19	4.9	10.9	43.3	0.9	-0.8	4.80	10.42	42.94	0.18	-0.15	-0.12	231,524	71.28	0.18	-0.19
5/30/2012	12:20	4.9	10.9	43	0.9	-0.8	4.80	10.42	42.64	0.18	-0.15	-0.12	231,524	70.78	0.18	-0.19
5/30/2012	12:21	4.9	10.9	43.5	0.7	-0.8	4.80	10.42	43.14	-0.02	-0.15	-0.12	231,524	71.61	-0.02	-0.19
5/30/2012	12:22	4.9	10.9	44	0.5	-0.8	4.80	10.42	43.64	-0.22	-0.15	-0.12	231,524	72.44	-0.22	-0.19
5/30/2012	12:23	4.9	10.9	44.4	0.5	0.5	4.80	10.42	44.04	-0.22	1.15	0.90	231,524	73.10	-0.22	1.45
5/30/2012	12:24	4.9	10.9	44.2	0.7	-0.5	4.80	10.42	43.84	-0.02	0.15	0.12	231,524	72.77	-0.02	0.19
5/30/2012	12:25	4.9	10.9	44	0.8	-0.8	4.80	10.42	43.64	0.08	-0.15	-0.12	231,524	72.44	0.08	-0.19
5/30/2012	12:26	4.9	10.9	44.4	0.8	-0.8	4.80	10.42	44.04	0.08	-0.15	-0.12	231,524	73.10	0.08	-0.19
5/30/2012	12:27	4.9	10.9	44.4	1	-0.8	4.80	10.42	44.04	0.28	-0.15	-0.12	231,524	73.10	0.29	-0.19
5/30/2012	12:28	4.9	10.9	43.8	1	-0.8	4.80	10.42	43.44	0.28	-0.15	-0.12	231,524	72.11	0.29	-0.19
5/30/2012	12:29	4.9	10.9	44.5	1	-0.2	4.80	10.42	44.14	0.28	0.45	0.35	231,524	73.27	0.29	0.56
5/30/2012	12:30	4.9	10.9	44.9	0.8	-0.7	4.80	10.42	44.54	0.08	-0.05	-0.04	231,524	73.93	0.08	-0.07
5/30/2012	12:31	4.9	10.9	44.3	0.9	-0.8	4.80	10.42	43.94	0.18	-0.15	-0.12	231,524	72.94	0.18	-0.19

Sun Coke Granite City CEM's Compliance Data

Compliance Test Run # 2

		Raw Data					Calibration Corrected Data						Flow Data	Mass Rates		
Date	Hour	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	THC (dry ppm)	(dscfm)	NOX (lb/hr)	CO (lb/hr)	THC (lb/hr)
5/30/2012	14:29	5.4	10.6	50.2	1.1	-0.8	5.40	10.60	50.20	1.10	-0.80	-0.65	222,364	80.03	1.07	-1.00
5/30/2012	14:30	5.4	10.5	50.3	1	-0.7	5.40	10.50	50.30	1.00	-0.70	-0.57	222,364	80.19	0.97	-0.87
5/30/2012	14:31	5.4	10.6	50.3	1	-0.7	5.40	10.60	50.30	1.00	-0.70	-0.57	222,364	80.19	0.97	-0.87
5/30/2012	14:32	5.3	10.6	50.1	1	-0.8	5.30	10.60	50.10	1.00	-0.80	-0.65	222,364	79.87	0.97	-1.00
5/30/2012	14:33	5.5	10.6	50.2	1.1	-0.7	5.50	10.60	50.20	1.10	-0.70	-0.57	222,364	80.03	1.07	-0.87
5/30/2012	14:34	5.6	10.5	51.6	1.1	-0.7	5.60	10.50	51.60	1.10	-0.70	-0.57	222,364	82.26	1.07	-0.87
5/30/2012	14:35	5.4	10.5	53.2	1.1	-0.8	5.40	10.50	53.20	1.10	-0.80	-0.65	222,364	84.81	1.07	-1.00
5/30/2012	14:36	5.4	10.6	53.2	1.1	-0.8	5.40	10.60	53.20	1.10	-0.80	-0.65	222,364	84.81	1.07	-1.00
5/30/2012	14:37	5.5	10.5	52.1	1.1	-0.8	5.50	10.50	52.10	1.10	-0.80	-0.65	222,364	83.06	1.07	-1.00
5/30/2012	14:38	5.5	10.5	52.6	1	-0.7	5.50	10.50	52.60	1.00	-0.70	-0.57	222,364	83.86	0.97	-0.87
5/30/2012	14:39	5.5	10.5	52.4	1.1	-0.8	5.50	10.50	52.40	1.10	-0.80	-0.65	222,364	83.54	1.07	-1.00
5/30/2012	14:40	5.4	10.5	52.5	1	-0.8	5.40	10.50	52.50	1.00	-0.80	-0.65	222,364	83.70	0.97	-1.00
5/30/2012	14:41	5.6	10.5	51.8	0.9	-0.8	5.60	10.50	51.80	0.90	-0.80	-0.65	222,364	82.58	0.87	-1.00
5/30/2012	14:42	5.7	10.4	52.2	1.1	-0.8	5.70	10.40	52.20	1.10	-0.80	-0.65	222,364	83.22	1.07	-1.00
5/30/2012	14:43	5.6	10.3	53	1.1	-0.8	5.60	10.30	53.00	1.10	-0.80	-0.65	222,364	84.49	1.07	-1.00
5/30/2012	14:44	5.5	10.4	53.9	1	-0.9	5.50	10.40	53.90	1.00	-0.90	-0.73	222,364	85.93	0.97	-1.12
5/30/2012	14:45	5.4	10.5	52.5	0.9	-0.9	5.40	10.50	52.50	0.90	-0.90	-0.73	222,364	83.70	0.87	-1.12
5/30/2012	14:46	5.5	10.5	51.9	1	-0.8	5.50	10.50	51.90	1.00	-0.80	-0.65	222,364	82.74	0.97	-1.00
5/30/2012	14:47	5.5	10.5	51.8	1	-0.9	5.50	10.50	51.80	1.00	-0.90	-0.73	222,364	82.58	0.97	-1.12
5/30/2012	14:48	5.5	10.5	51.6	1.1	-0.7	5.50	10.50	51.60	1.10	-0.70	-0.57	222,364	82.26	1.07	-0.87
5/30/2012	14:49	5.4	10.5	52.2	1.1	-0.8	5.40	10.50	52.20	1.10	-0.80	-0.65	222,364	83.22	1.07	-1.00
5/30/2012	14:50	5.3	10.6	51.3	1.1	-0.9	5.30	10.60	51.30	1.10	-0.90	-0.73	222,364	81.78	1.07	-1.12
5/30/2012	14:51	5.4	10.6	50.4	1.2	-0.9	5.40	10.60	50.40	1.20	-0.90	-0.73	222,364	80.35	1.16	-1.12
5/30/2012	14:52	5.5	10.5	51.1	1.2	-0.9	5.50	10.50	51.10	1.20	-0.90	-0.73	222,364	81.46	1.16	-1.12
5/30/2012	14:53	5.5	10.5	51.5	1.2	-0.9	5.50	10.50	51.50	1.20	-0.90	-0.73	222,364	82.10	1.16	-1.12
5/30/2012	14:54	5.4	10.5	52.3	1.2	-0.9	5.40	10.50	52.30	1.20	-0.90	-0.73	222,364	83.38	1.16	-1.12
5/30/2012	14:55	5.5	10.5	51.9	1.2	-0.9	5.50	10.50	51.90	1.20	-0.90	-0.73	222,364	82.74	1.16	-1.12
5/30/2012	14:56	5.5	10.5	49.7	1.1	-0.9	5.50	10.50	49.70	1.10	-0.90	-0.73	222,364	79.23	1.07	-1.12
5/30/2012	14:57	5.5	10.4	50.5	1.1	-0.9	5.50	10.40	50.50	1.10	-0.90	-0.73	222,364	80.51	1.07	-1.12
5/30/2012	14:58	5.5	10.4	51.2	1.2	-0.9	5.50	10.40	51.20	1.20	-0.90	-0.73	222,364	81.62	1.16	-1.12
5/30/2012	14:59	5.6	10.4	51.6	0.9	-0.9	5.60	10.40	51.60	0.90	-0.90	-0.73	222,364	82.26	0.87	-1.12
5/30/2012	15:00	5.5	10.4	52.2	0.8	-0.8	5.50	10.40	52.20	0.80	-0.80	-0.65	222,364	83.22	0.78	-1.00
5/30/2012	15:01	5.5	10.4	51.6	0.9	-0.9	5.50	10.40	51.60	0.90	-0.90	-0.73	222,364	82.26	0.87	-1.12
5/30/2012	15:02	5.6	10.4	50.5	0.8	-0.9	5.60	10.40	50.50	0.80	-0.90	-0.73	222,364	80.51	0.78	-1.12

Sun Coke Granite City CEM's Compliance Data

Compliance Test Run # 2

		Raw Data					Calibration Corrected Data						Flow Data	Mass Rates		
Date	Hour	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	THC (dry ppm)	(dscfm)	NOX (lb/hr)	CO (lb/hr)	THC (lb/hr)
5/30/2012	15:03	5.6	10.4	50.6	0.8	-0.8	5.60	10.40	50.60	0.80	-0.80	-0.65	222,364	80.67	0.78	-1.00
5/30/2012	15:04	5.5	10.4	51.3	0.8	-0.9	5.50	10.40	51.30	0.80	-0.90	-0.73	222,364	81.78	0.78	-1.12
5/30/2012	15:05	5.5	10.5	50.6	0.8	-0.9	5.50	10.50	50.60	0.80	-0.90	-0.73	222,364	80.67	0.78	-1.12
5/30/2012	15:06	5.6	10.5	50.1	0.9	-0.9	5.60	10.50	50.10	0.90	-0.90	-0.73	222,364	79.87	0.87	-1.12
5/30/2012	15:07	5.6	10.4	49.6	0.9	-0.9	5.60	10.40	49.60	0.90	-0.90	-0.73	222,364	79.07	0.87	-1.12
5/30/2012	15:08	5.5	10.4	50.3	1	-0.8	5.50	10.40	50.30	1.00	-0.80	-0.65	222,364	80.19	0.97	-1.00
5/30/2012	15:09	5.5	10.5	49.8	0.7	-0.9	5.50	10.50	49.80	0.70	-0.90	-0.73	222,364	79.39	0.68	-1.12
5/30/2012	15:10	5.5	10.5	48.9	0.9	-0.8	5.50	10.50	48.90	0.90	-0.80	-0.65	222,364	77.96	0.87	-1.00
5/30/2012	15:11	5.6	10.4	49	0.9	-0.9	5.60	10.40	49.00	0.90	-0.90	-0.73	222,364	78.12	0.87	-1.12
5/30/2012	15:12	5.6	10.4	49.3	1	-0.9	5.60	10.40	49.30	1.00	-0.90	-0.73	222,364	78.59	0.97	-1.12
5/30/2012	15:13	5.6	10.4	48.7	1	-0.9	5.60	10.40	48.70	1.00	-0.90	-0.73	222,364	77.64	0.97	-1.12
5/30/2012	15:14	5.5	10.4	48.4	1	-0.9	5.50	10.40	48.40	1.00	-0.90	-0.73	222,364	77.16	0.97	-1.12
5/30/2012	15:15	5.6	10.4	47.9	0.9	-0.9	5.60	10.40	47.90	0.90	-0.90	-0.73	222,364	76.36	0.87	-1.12
5/30/2012	15:16	5.6	10.4	48.1	0.8	-0.9	5.60	10.40	48.10	0.80	-0.90	-0.73	222,364	76.68	0.78	-1.12
5/30/2012	15:17	5.6	10.4	48.5	0.8	-0.9	5.60	10.40	48.50	0.80	-0.90	-0.73	222,364	77.32	0.78	-1.12
5/30/2012	15:18	5.6	10.4	48.5	0.9	-0.9	5.60	10.40	48.50	0.90	-0.90	-0.73	222,364	77.32	0.87	-1.12
5/30/2012	15:19	5.6	10.4	48.7	0.8	-0.9	5.60	10.40	48.70	0.80	-0.90	-0.73	222,364	77.64	0.78	-1.12
5/30/2012	15:20	5.6	10.4	48.6	0.5	-0.9	5.60	10.40	48.60	0.50	-0.90	-0.73	222,364	77.48	0.49	-1.12
5/30/2012	15:21	5.6	10.4	48.5	0.6	-0.9	5.60	10.40	48.50	0.60	-0.90	-0.73	222,364	77.32	0.58	-1.12
5/30/2012	15:22	5.6	10.4	48.3	0.5	-0.9	5.60	10.40	48.30	0.50	-0.90	-0.73	222,364	77.00	0.49	-1.12
5/30/2012	15:23	5.5	10.4	48.7	0.5	-0.9	5.50	10.40	48.70	0.50	-0.90	-0.73	222,364	77.64	0.49	-1.12
5/30/2012	15:24	5.5	10.5	47.6	0.5	-0.9	5.50	10.50	47.60	0.50	-0.90	-0.73	222,364	75.88	0.49	-1.12
5/30/2012	15:25	5.5	10.4	48.1	0.5	-0.9	5.50	10.40	48.10	0.50	-0.90	-0.73	222,364	76.68	0.49	-1.12
5/30/2012	15:26	5.6	10.4	48.1	0.7	-0.9	5.60	10.40	48.10	0.70	-0.90	-0.73	222,364	76.68	0.68	-1.12
5/30/2012	15:27	5.6	10.4	48	0.7	-0.9	5.60	10.40	48.00	0.70	-0.90	-0.73	222,364	76.52	0.68	-1.12
5/30/2012	15:28	5.6	10.4	47.7	0.7	-0.9	5.60	10.40	47.70	0.70	-0.90	-0.73	222,364	76.04	0.68	-1.12
5/30/2012	15:29	5.5	10.4	48.3	0.6	-0.9	5.50	10.40	48.30	0.60	-0.90	-0.73	222,364	77.00	0.58	-1.12
5/30/2012	15:30	5.5	10.5	48.2	0.6	-0.9	5.50	10.50	48.20	0.60	-0.90	-0.73	222,364	76.84	0.58	-1.12
5/30/2012	15:31	5.6	10.4	47.7	0.5	-0.9	5.60	10.40	47.70	0.50	-0.90	-0.73	222,364	76.04	0.49	-1.12
5/30/2012	15:32	5.6	10.4	48.2	0.5	-0.9	5.60	10.40	48.20	0.50	-0.90	-0.73	222,364	76.84	0.49	-1.12
5/30/2012	15:33	5.6	10.4	48.7	0.7	-0.9	5.60	10.40	48.70	0.70	-0.90	-0.73	222,364	77.64	0.68	-1.12
5/30/2012	15:34	5.6	10.4	48.9	0.7	-0.9	5.60	10.40	48.90	0.70	-0.90	-0.73	222,364	77.96	0.68	-1.12
5/30/2012	15:35	5.6	10.4	48.9	0.6	-0.8	5.60	10.40	48.90	0.60	-0.80	-0.65	222,364	77.96	0.58	-1.00
5/30/2012	15:36	5.6	10.4	48.6	0.7	-0.9	5.60	10.40	48.60	0.70	-0.90	-0.73	222,364	77.48	0.68	-1.12

Sun Coke Granite City CEM's Compliance Data

Compliance Test Run # 1

		Raw Data					Calibration Corrected Data						Flow Data	Mass Rates		
Date	Hour	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	THC (dry ppm)	(dscfm)	NOX (lb/hr)	CO (lb/hr)	THC (lb/hr)
5/30/2012	12:32	4.9	10.9	43.8	0.8	-0.8	4.80	10.42	43.44	0.08	-0.15	-0.12	231,524	72.11	0.08	-0.19
5/30/2012	12:33	5	10.8	44	0.8	-0.7	4.90	10.32	43.64	0.08	-0.05	-0.04	231,524	72.44	0.08	-0.07
5/30/2012	12:34	4.9	10.8	44.5	0.8	-0.6	4.80	10.32	44.14	0.08	0.05	0.04	231,524	73.27	0.08	0.06
5/30/2012	12:35	4.9	10.9	44.9	0.8	-0.7	4.80	10.42	44.54	0.08	-0.05	-0.04	231,524	73.93	0.08	-0.07
5/30/2012	12:36	4.9	10.9	44.3	0.9	-0.7	4.80	10.42	43.94	0.18	-0.05	-0.04	231,524	72.94	0.18	-0.07
5/30/2012	12:37	4.9	10.9	44.4	0.9	-0.7	4.80	10.42	44.04	0.18	-0.05	-0.04	231,524	73.10	0.18	-0.07
5/30/2012	12:38	5	10.9	44	1	-0.8	4.90	10.42	43.64	0.28	-0.15	-0.12	231,524	72.44	0.29	-0.19
5/30/2012	12:39	5.2	10.8	44.6	0.9	-0.8	5.10	10.32	44.24	0.18	-0.15	-0.12	231,524	73.43	0.18	-0.19
5/30/2012	12:40	5.2	10.7	45.6	0.9	-0.8	5.10	10.22	45.24	0.18	-0.15	-0.12	231,524	75.09	0.18	-0.19
5/30/2012	12:41	5	10.7	46.6	0.9	-0.8	4.90	10.22	46.24	0.18	-0.15	-0.12	231,524	76.75	0.18	-0.19
5/30/2012	12:42	4.9	10.8	45.9	0.8	-0.8	4.80	10.32	45.54	0.08	-0.15	-0.12	231,524	75.59	0.08	-0.19
5/30/2012	12:43	4.9	10.9	44.9	0.9	-0.1	4.80	10.42	44.54	0.18	0.55	0.43	231,524	73.93	0.18	0.69
5/30/2012	12:44	5	10.9	44.8	0.9	-0.7	4.90	10.42	44.44	0.18	-0.05	-0.04	231,524	73.77	0.18	-0.07
Averages		5.12	10.74	45.82	0.85	-0.68	5.02	10.26	45.46	0.13	-0.03	-0.03	231,524	75.46	0.13	-0.04

CEM Calibration & Test Data

Run 2

CEM CALIBRATIONS

PROJECT NAME	GECC Main Stack Compliance
PROJECT NUMBER	39400684.00001
DATE	May 30, 2012
RUN NUMBER	R-2
START TIME	1:55 PM
STOP TIME	3:54 PM

ANALYZER SPAN	
CO	90
CO_2	21
O_2	21
NO_x	99
SO_2	0
THC	90

		CALIBRATION ERROR			SYSTEM BIAS CHECK								
					PRETEST		POST TEST						
	GAS CYLINDER NUMBER	CAL. GAS VALUE (% or PPM)	ANALYZER RESPONSE (% or PPM)	CAL ERROR (% SPAN)	SYSTEM RESP.	SYS. BIAS (% SPAN)	SYSTEM RESP.	SYS. BIAS (% SPAN)	DRIFT (% SPAN)	IS CAL ERROR CHECK OK? (YES/NO)	IS PRETEST BIAS OK? (YES/NO)	IS POSTEST BIAS OK? (YES/NO)	IS SYSTEM DRIFT OK? (YES/NO)
CO zero	n/a	0.00	0.00	0.00	0.90	-1.00	0.50	-0.56	0.45	YES	YES	YES	YES
CO mid	XC027692	50.27	50.70	-0.48	49.80	1.00	49.50	1.34	0.33	YES	YES	YES	YES
CO hi	SG9197301	89.52	89.70	-0.20									
CO_2 zero	n/a	0.00	0.10	-0.48	0.10	0.00	0.10	0.00	0.00	YES	YES	YES	YES
CO_2 mid	CC286931	9.92	9.80	0.57	9.70	0.48	9.80	0.00	-0.48	YES	YES	YES	YES
CO_2 hi	CC94024	20.69	20.80	-0.53									
O_2 zero	n/a	0.00	0.00	0.00	0.70	-3.34	0.50	-2.39	0.95	YES	YES	YES	YES
O_2 mid	CC286931	10.03	10.10	-0.33	10.00	0.48	9.90	0.95	0.48	YES	YES	YES	YES
O_2 hi	CC94024	20.96	20.60	1.72									
NO_x zero	n/a	0.00	0.00	0.00	0.40	-0.40	0.40	-0.40	0.00	YES	YES	YES	YES
NO_x mid	SG9151860	44.91	44.90	0.01	43.40	1.52	43.30	1.62	0.10	YES	YES	YES	YES
NO_x hi	CC3911	98.95	99.10	-0.15									
THC zero	n/a	0.00	-0.60	0.67	-0.70	0.11	-1.00	0.44	0.33	YES	YES	YES	YES
THC mid	XC005711	50.43	49.70	0.81									
THC low	CC170826	25.03	24.20	0.92	24.70	-0.56	24.10	0.11	0.67	YES	YES	YES	YES
THC hi	CC178781	89.90	90.20	-0.33									

Correction factors

CO	Avg. Conc -	0.7	*	1.0269663
CO_2	Avg. Conc -	0.1	*	1.0276684
O_2	Avg. Conc -	0.6	*	1.0727273
NO_x	Avg. Conc -	0.4	*	1.0456345
THC	Avg. Conc -	-0.85	*	0.9912871

Calibration error = ((cal. gas value - analyzer resp) / analyzer span) * 100: allowable error ± 2 % , ± 5 % for THC

System Bias = ((analyzer resp - system resp) / analyzer span) * 100: allowable error ± 5 %

Drift = ((pretest sys resp - post test sys resp) / analyzer span) * 100: allowable error ± 3 %

Sys Bias (pre and post) must be performed on each run: To determine Drift.
Use zero gas and either mid or hi cal gas, choose cal gas closest to measured stack concentration.

Drift must be performed every hour on THC

Calibration Error is performed only at start, unless allowable error parameters are exceeded.

Sun Coke Granite City CEM's Compliance Data

Compliance Test Run # 2

		Raw Data					Calibration Corrected Data						Flow Data	Mass Rates		
Date	Hour	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	THC (dry ppm)	(dscfm)	NOX (lb/hr)	CO (lb/hr)	THC (lb/hr)
5/30/2012	13:55	5	10.8	45.9	0.9	-0.8	5.00	10.80	45.90	0.90	-0.80	-0.65	222,364	73.17	0.87	-1.00
5/30/2012	13:56	4.9	10.8	46.1	0.8	-0.9	4.90	10.80	46.10	0.80	-0.90	-0.73	222,364	73.49	0.78	-1.12
5/30/2012	13:57	4.9	10.9	45.8	0.9	-0.9	4.90	10.90	45.80	0.90	-0.90	-0.73	222,364	73.02	0.87	-1.12
5/30/2012	13:58	5	10.8	45.9	0.9	-0.5	5.00	10.80	45.90	0.90	-0.50	-0.40	222,364	73.17	0.87	-0.62
5/30/2012	13:59	5	10.8	45.8	0.6	-0.9	5.00	10.80	45.80	0.60	-0.90	-0.73	222,364	73.02	0.58	-1.12
5/30/2012	14:00	5	10.8	46	0.8	-0.8	5.00	10.80	46.00	0.80	-0.80	-0.65	222,364	73.33	0.78	-1.00
5/30/2012	14:01	5	10.8	46.5	0.7	-0.9	5.00	10.80	46.50	0.70	-0.90	-0.73	222,364	74.13	0.68	-1.12
5/30/2012	14:02	5.1	10.8	46.5	0.7	-0.9	5.10	10.80	46.50	0.70	-0.90	-0.73	222,364	74.13	0.68	-1.12
5/30/2012	14:03	5.3	10.7	47.4	0.7	-0.5	5.30	10.70	47.40	0.70	-0.50	-0.40	222,364	75.57	0.68	-0.62
5/30/2012	14:04	5.4	10.6	49.6	0.7	-0.9	5.40	10.60	49.60	0.70	-0.90	-0.73	222,364	79.07	0.68	-1.12
5/30/2012	14:05	5.4	10.5	51.1	0.8	-0.9	5.40	10.50	51.10	0.80	-0.90	-0.73	222,364	81.46	0.78	-1.12
5/30/2012	14:06	5.4	10.5	51.7	0.7	-0.8	5.40	10.50	51.70	0.70	-0.80	-0.65	222,364	82.42	0.68	-1.00
5/30/2012	14:07	5.3	10.6	51.4	0.8	-0.9	5.30	10.60	51.40	0.80	-0.90	-0.73	222,364	81.94	0.78	-1.12
5/30/2012	14:08	5.3	10.6	50.2	0.9	-0.9	5.30	10.60	50.20	0.90	-0.90	-0.73	222,364	80.03	0.87	-1.12
5/30/2012	14:09	5.3	10.6	49.7	1	-0.8	5.30	10.60	49.70	1.00	-0.80	-0.65	222,364	79.23	0.97	-1.00
5/30/2012	14:10	5.3	10.6	50	0.9	-0.9	5.30	10.60	50.00	0.90	-0.90	-0.73	222,364	79.71	0.87	-1.12
5/30/2012	14:11	5.3	10.6	50.5	0.8	-0.8	5.30	10.60	50.50	0.80	-0.80	-0.65	222,364	80.51	0.78	-1.00
5/30/2012	14:12	5.3	10.6	50.4	0.8	-0.9	5.30	10.60	50.40	0.80	-0.90	-0.73	222,364	80.35	0.78	-1.12
5/30/2012	14:13	5.3	10.6	50	0.9	-0.9	5.30	10.60	50.00	0.90	-0.90	-0.73	222,364	79.71	0.87	-1.12
5/30/2012	14:14	5.4	10.6	49.8	0.9	-0.9	5.40	10.60	49.80	0.90	-0.90	-0.73	222,364	79.39	0.87	-1.12
5/30/2012	14:15	5.4	10.6	50.9	0.9	-0.4	5.40	10.60	50.90	0.90	-0.40	-0.32	222,364	81.15	0.87	-0.50
5/30/2012	14:16	5.3	10.6	51.3	0.9	-0.8	5.30	10.60	51.30	0.90	-0.80	-0.65	222,364	81.78	0.87	-1.00
5/30/2012	14:17	5.3	10.6	50.3	0.9	-0.9	5.30	10.60	50.30	0.90	-0.90	-0.73	222,364	80.19	0.87	-1.12
5/30/2012	14:18	5.3	10.6	50.1	0.8	-0.9	5.30	10.60	50.10	0.80	-0.90	-0.73	222,364	79.87	0.78	-1.12
5/30/2012	14:19	5.4	10.6	50	0.9	-0.8	5.40	10.60	50.00	0.90	-0.80	-0.65	222,364	79.71	0.87	-1.00
5/30/2012	14:20	5.3	10.6	50.7	1	-0.8	5.30	10.60	50.70	1.00	-0.80	-0.65	222,364	80.83	0.97	-1.00
5/30/2012	14:21	5.3	10.6	50.3	1.1	-0.8	5.30	10.60	50.30	1.10	-0.80	-0.65	222,364	80.19	1.07	-1.00
5/30/2012	14:22	5.4	10.6	50	0.9	-0.9	5.40	10.60	50.00	0.90	-0.90	-0.73	222,364	79.71	0.87	-1.12
5/30/2012	14:23	5.5	10.6	50.5	0.9	-0.7	5.50	10.60	50.50	0.90	-0.70	-0.57	222,364	80.51	0.87	-0.87
5/30/2012	14:24	5.4	10.5	50.9	1.1	-0.8	5.40	10.50	50.90	1.10	-0.80	-0.65	222,364	81.15	1.07	-1.00
5/30/2012	14:25	5.4	10.5	50.6	1.3	-0.8	5.40	10.50	50.60	1.30	-0.80	-0.65	222,364	80.67	1.26	-1.00
5/30/2012	14:26	5.4	10.5	50.4	1.2	-0.8	5.40	10.50	50.40	1.20	-0.80	-0.65	222,364	80.35	1.16	-1.00
5/30/2012	14:27	5.4	10.5	50.3	1	-0.8	5.40	10.50	50.30	1.00	-0.80	-0.65	222,364	80.19	0.97	-1.00
5/30/2012	14:28	5.4	10.6	49.8	0.9	-0.8	5.40	10.60	49.80	0.90	-0.80	-0.65	222,364	79.39	0.87	-1.00

Sun Coke Granite City CEM's Compliance Data

Compliance Test Run # 2

		Raw Data					Calibration Corrected Data						Flow Data	Mass Rates		
Date	Hour	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	THC (dry ppm)	(dscfm)	NOX (lb/hr)	CO (lb/hr)	THC (lb/hr)
5/30/2012	15:37	5.6	10.4	48.6	0.8	-0.9	5.60	10.40	48.60	0.80	-0.90	-0.73	222,364	77.48	0.78	-1.12
5/30/2012	15:38	5.6	10.4	48.8	1	-0.9	5.60	10.40	48.80	1.00	-0.90	-0.73	222,364	77.80	0.97	-1.12
5/30/2012	15:39	5.5	10.4	48.3	0.9	-0.9	5.50	10.40	48.30	0.90	-0.90	-0.73	222,364	77.00	0.87	-1.12
5/30/2012	15:40	5.6	10.4	48.7	0.8	-0.9	5.60	10.40	48.70	0.80	-0.90	-0.73	222,364	77.64	0.78	-1.12
5/30/2012	15:41	5.7	10.4	49.9	0.9	-0.9	5.70	10.40	49.90	0.90	-0.90	-0.73	222,364	79.55	0.87	-1.12
5/30/2012	15:42	5.7	10.3	50.8	0.8	-0.9	5.70	10.30	50.80	0.80	-0.90	-0.73	222,364	80.99	0.78	-1.12
5/30/2012	15:43	5.6	10.4	50.9	0.9	-0.9	5.60	10.40	50.90	0.90	-0.90	-0.73	222,364	81.15	0.87	-1.12
5/30/2012	15:44	5.6	10.4	50.4	0.7	-0.9	5.60	10.40	50.40	0.70	-0.90	-0.73	222,364	80.35	0.68	-1.12
5/30/2012	15:45	5.6	10.4	50.6	0.7	-0.9	5.60	10.40	50.60	0.70	-0.90	-0.73	222,364	80.67	0.68	-1.12
5/30/2012	15:46	5.6	10.4	50.5	0.6	-0.9	5.60	10.40	50.50	0.60	-0.90	-0.73	222,364	80.51	0.58	-1.12
5/30/2012	15:47	5.6	10.4	49.9	0.6	-0.9	5.60	10.40	49.90	0.60	-0.90	-0.73	222,364	79.55	0.58	-1.12
5/30/2012	15:48	5.6	10.4	49.8	0.6	-0.9	5.60	10.40	49.80	0.60	-0.90	-0.73	222,364	79.39	0.58	-1.12
5/30/2012	15:49	5.7	10.4	50	0.7	-0.9	5.70	10.40	50.00	0.70	-0.90	-0.73	222,364	79.71	0.68	-1.12
5/30/2012	15:50	5.7	10.3	50	0.7	-0.9	5.70	10.30	50.00	0.70	-0.90	-0.73	222,364	79.71	0.68	-1.12
5/30/2012	15:51	5.7	10.3	50.4	0.6	-0.9	5.70	10.30	50.40	0.60	-0.90	-0.73	222,364	80.35	0.58	-1.12
5/30/2012	15:52	5.6	10.3	50.2	0.7	-0.9	5.60	10.30	50.20	0.70	-0.90	-0.73	222,364	80.03	0.68	-1.12
5/30/2012	15:53	5.7	10.4	49.7	0.8	-0.9	5.70	10.40	49.70	0.80	-0.90	-0.73	222,364	79.23	0.78	-1.12
5/30/2012	15:54	5.7	10.3	50.1	0.8	-0.9	5.70	10.30	50.10	0.80	-0.90	-0.73	222,364	79.87	0.78	-1.12
Averages		5.47	10.49	49.91	0.87	-0.85	5.47	10.49	49.91	0.87	-0.85	-0.69	222,364	79.56	0.84	-1.06

CEM Calibration & Test Data

Run 3

CEM CALIBRATIONS

PROJECT NAME	GECC Main Stack Compliance
PROJECT NUMBER	39400684.00001
DATE	May 30, 2012
RUN NUMBER	R-3
START TIME	7:02 PM
STOP TIME	11:57 PM

ANALYZER SPAN	
CO	90
CO_2	21
O_2	21
NO_x	99
SO_2	0
THC	90

		CALIBRATION ERROR			SYSTEM BIAS CHECK								
					PRETEST		POST TEST						
	GAS CYLINDER NUMBER	CAL. GAS VALUE (% or PPM)	ANALYZER RESPONSE (% or PPM)	CAL ERROR (% SPAN)	SYSTEM RESP.	SYS. BIAS (% SPAN)	SYSTEM RESP.	SYS. BIAS (% SPAN)	DRIFT (% SPAN)	IS CAL ERROR CHECK OK? (YES/NO)	IS PRETEST BIAS OK? (YES/NO)	IS POSTEST BIAS OK? (YES/NO)	IS SYSTEM DRIFT OK? (YES/NO)
CO zero	n/a	0.00	0.00	0.00	0.06	-0.07	0.30	-0.33	-0.27	YES	YES	YES	YES
CO mid	XC027692	50.27	50.70	-0.48	51.47	-0.86	50.20	0.56	1.42	YES	YES	YES	YES
CO hi	SG9197301	89.52	89.70	-0.20									
CO_2 zero	n/a	0.00	0.10	-0.48	0.07	0.14	0.10	0.00	-0.14	YES	YES	YES	YES
CO_2 mid	CC286931	9.92	9.80	0.57	12.58	-13.44	9.80	0.00	13.44	YES	YES	YES	NO
CO_2 hi	CC94024	20.69	20.80	-0.53									
O_2 zero	n/a	0.00	0.00	0.00	0.07	-0.33	0.40	-1.91	-1.57	YES	YES	YES	YES
O_2 mid	CC286931	10.03	10.10	-0.33	12.67	-12.26	9.90	0.95	13.22	YES	NO	YES	NO
O_2 hi	CC94024	20.96	20.60	1.72									
NO_x zero	n/a	0.00	0.00	0.00	0.30	-0.30	0.40	-0.40	-0.10	YES	YES	YES	YES
NO_x mid	SG9151860	44.91	44.90	0.01	45.40	-0.51	45.60	-0.71	-0.20	YES	NO	YES	YES
NO_x hi	CC3911	98.95	99.10	-0.15									
THC zero	n/a	0.00	-0.60	0.67	0.00	-0.67	-1.10	0.56	1.22	YES	YES	YES	YES
THC mid	XC005711	50.43	49.70	0.81									
THC low	CC170826	25.03	24.20	0.92	25.70	-1.67	25.50	-1.45	0.22	YES	YES	YES	YES
THC hi	CC178781	89.90	90.20	-0.33									

Correction factors

CO	Avg. Conc	-	0.18	* 0.9923996
CO_2	Avg. Conc	-	0.085	* 0.8930212
O_2	Avg. Conc	-	0.235	* 0.9076923
NO_x	Avg. Conc	-	0.35	* 0.9946844
THC	Avg. Conc	-	-0.55	* 0.9571702

Calibration error = ((cal. gas value - analyzer resp) / analyzer span) * 100: allowable error ± 2 % , ± 5 % for THC

System Bias = ((analyzer resp - system resp) / analyzer span) * 100: allowable error ± 5 %

Drift = ((pretest sys resp - post test sys resp) / analyzer span) * 100: allowable error ± 3 %

Sys Bias (pre and post) must be performed on each run: To determine Drift.
Use zero gas and either mid or hi cal gas, choose cal gas closest to measured stack concentration.

Drift must be performed every hour on THC

Calibration Error is performed only at start, unless allowable error parameters are exceeded.

Sun Coke Granite City CEM's Compliance Data

Compliance Test Run # 3

		Raw Data					Calibration Corrected Data						Flow Data	Mass Rates		
Date	Hour	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	THC (dry ppm)	(dscfm)	NOX (lb/hr)	CO (lb/hr)	THC (lb/hr)
5/30/2012	19:02	7	9.5	47.4	0.8	-0.9	7.00	9.50	47.40	0.80	-0.90	-0.75	243,821	82.86	0.85	-1.27
5/30/2012	19:03	7.1	9.4	47.2	0.7	-1	7.10	9.40	47.20	0.70	-1.00	-0.83	243,821	82.51	0.75	-1.41
5/30/2012	19:04	7.1	9.4	48.1	0.6	-1	7.10	9.40	48.10	0.60	-1.00	-0.83	243,821	84.08	0.64	-1.41
5/30/2012	19:05	7	9.4	49.7	0.7	-1	7.00	9.40	49.70	0.70	-1.00	-0.83	243,821	86.88	0.75	-1.41
5/30/2012	19:06	6.9	9.5	50.1	0.8	-1	6.90	9.50	50.10	0.80	-1.00	-0.83	243,821	87.58	0.85	-1.41
5/30/2012	19:07	6.8	9.5	49.9	0.8	-1	6.80	9.50	49.90	0.80	-1.00	-0.83	243,821	87.23	0.85	-1.41
5/30/2012	19:08	6.8	9.6	49.4	0.6	-1	6.80	9.60	49.40	0.60	-1.00	-0.83	243,821	86.35	0.64	-1.41
5/30/2012	19:09	6.9	9.5	50	0.6	-0.6	6.90	9.50	50.00	0.60	-0.60	-0.50	243,821	87.40	0.64	-0.84
5/30/2012	19:10	6.9	9.5	49.6	0.8	-0.9	6.90	9.50	49.60	0.80	-0.90	-0.75	243,821	86.70	0.85	-1.27
5/30/2012	19:11	7	9.5	48.8	0.8	-1	7.00	9.50	48.80	0.80	-1.00	-0.83	243,821	85.30	0.85	-1.41
5/30/2012	19:12	6.9	9.4	47.9	0.8	-1	6.90	9.40	47.90	0.80	-1.00	-0.83	243,821	83.73	0.85	-1.41
5/30/2012	19:13	6.9	9.5	47.7	0.6	-1	6.90	9.50	47.70	0.60	-1.00	-0.83	243,821	83.38	0.64	-1.41
5/30/2012	19:14	6.8	9.5	48.1	0.6	-1	6.80	9.50	48.10	0.60	-1.00	-0.83	243,821	84.08	0.64	-1.41
5/30/2012	19:15	6.8	9.6	48.3	0.7	-1	6.80	9.60	48.30	0.70	-1.00	-0.83	243,821	84.43	0.75	-1.41
5/30/2012	19:16	6.8	9.6	48.2	0.8	-0.9	6.80	9.60	48.20	0.80	-0.90	-0.75	243,821	84.26	0.85	-1.27
5/30/2012	19:17	6.8	9.5	47.9	1	-0.9	6.80	9.50	47.90	1.00	-0.90	-0.75	243,821	83.73	1.06	-1.27
5/30/2012	19:18	6.7	9.5	48.5	0.8	-1	6.70	9.50	48.50	0.80	-1.00	-0.83	243,821	84.78	0.85	-1.41
5/30/2012	19:19	6.7	9.6	48.3	0.8	-1	6.70	9.60	48.30	0.80	-1.00	-0.83	243,821	84.43	0.85	-1.41
5/30/2012	19:20	6.7	9.6	47.9	0.8	-1	6.70	9.60	47.90	0.80	-1.00	-0.83	243,821	83.73	0.85	-1.41
5/30/2012	19:21	6.6	9.6	48.7	0.8	-0.8	6.60	9.60	48.70	0.80	-0.80	-0.67	243,821	85.13	0.85	-1.13
5/30/2012	19:22	6.5	9.7	49.5	0.8	-0.9	6.50	9.70	49.50	0.80	-0.90	-0.75	243,821	86.53	0.85	-1.27
5/30/2012	19:23	6.5	9.7	49.2	0.8	-1	6.50	9.70	49.20	0.80	-1.00	-0.83	243,821	86.00	0.85	-1.41
5/30/2012	19:24	6.6	9.7	49.3	0.9	-1	6.60	9.70	49.30	0.90	-1.00	-0.83	243,821	86.18	0.96	-1.41
5/30/2012	19:25	6.6	9.6	49.8	0.8	-1	6.60	9.60	49.80	0.80	-1.00	-0.83	243,821	87.05	0.85	-1.41
5/30/2012	19:26	6.4	9.7	50.6	0.8	-1	6.40	9.70	50.60	0.80	-1.00	-0.83	243,821	88.45	0.85	-1.41
5/30/2012	19:27	6.3	9.8	50.8	0.9	-1	6.30	9.80	50.80	0.90	-1.00	-0.83	243,821	88.80	0.96	-1.41
5/30/2012	19:28	6.4	9.8	49.5	0.9	-1	6.40	9.80	49.50	0.90	-1.00	-0.83	243,821	86.53	0.96	-1.41
5/30/2012	19:29	6.3	9.8	49.7	1.3	-1	6.30	9.80	49.70	1.30	-1.00	-0.83	243,821	86.88	1.38	-1.41
5/30/2012	19:30	6.3	9.8	51.1	1.2	-0.9	6.30	9.80	51.10	1.20	-0.90	-0.75	243,821	89.33	1.28	-1.27
5/30/2012	19:31	6.4	9.9	51.2	1.1	-1	6.40	9.90	51.20	1.10	-1.00	-0.83	243,821	89.50	1.17	-1.41
5/30/2012	19:32	6.4	9.8	51	0.9	-1	6.40	9.80	51.00	0.90	-1.00	-0.83	243,821	89.15	0.96	-1.41
5/30/2012	19:33	6.4	9.8	51.9	0.9	-1	6.40	9.80	51.90	0.90	-1.00	-0.83	243,821	90.72	0.96	-1.41
5/30/2012	19:34	6.4	9.8	52	0.8	-1	6.40	9.80	52.00	0.80	-1.00	-0.83	243,821	90.90	0.85	-1.41
5/30/2012	19:35	6.3	9.8	52.1	0.9	-1	6.30	9.80	52.10	0.90	-1.00	-0.83	243,821	91.07	0.96	-1.41

Sun Coke Granite City CEM's Compliance Data

Compliance Test Run # 3

		Raw Data					Calibration Corrected Data						Flow Data	Mass Rates		
Date	Hour	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	THC (dry ppm)	(dscfm)	NOX (lb/hr)	CO (lb/hr)	THC (lb/hr)
5/30/2012	19:36	6.4	9.8	51.6	1.2	-1	6.40	9.80	51.60	1.20	-1.00	-0.83	243,821	90.20	1.28	-1.41
5/30/2012	19:37	6.3	9.8	51.1	4	-1	6.30	9.80	51.10	4.00	-1.00	-0.83	243,821	89.33	4.26	-1.41
5/30/2012	19:38	6.4	9.8	51.2	16.6	-1	6.40	9.80	51.20	16.60	-1.00	-0.83	243,821	89.50	17.67	-1.41
5/30/2012	19:39	6.4	9.8	50.9	14	-1	6.40	9.80	50.90	14.00	-1.00	-0.83	243,821	88.98	14.90	-1.41
5/30/2012	19:40	6.4	9.8	52	3.8	-1	6.40	9.80	52.00	3.80	-1.00	-0.83	243,821	90.90	4.04	-1.41
5/30/2012	19:41	6.3	9.8	53	1.6	-1	6.30	9.80	53.00	1.60	-1.00	-0.83	243,821	92.65	1.70	-1.41
5/30/2012	19:42	6.2	9.8	54	1.3	-1	6.20	9.80	54.00	1.30	-1.00	-0.83	243,821	94.39	1.38	-1.41
5/30/2012	19:43	6.2	9.9	54.4	1.1	-1	6.20	9.90	54.40	1.10	-1.00	-0.83	243,821	95.09	1.17	-1.41
5/30/2012	19:44	6.2	9.9	54.7	1.1	-1	6.20	9.90	54.70	1.10	-1.00	-0.83	243,821	95.62	1.17	-1.41
5/30/2012	19:45	6.2	9.9	54.4	1	-1	6.20	9.90	54.40	1.00	-1.00	-0.83	243,821	95.09	1.06	-1.41
5/30/2012	19:46	6.2	9.9	53.8	0.8	-1	6.20	9.90	53.80	0.80	-1.00	-0.83	243,821	94.05	0.85	-1.41
5/30/2012	19:47	6.1	9.9	54.3	0.9	-1	6.10	9.90	54.30	0.90	-1.00	-0.83	243,821	94.92	0.96	-1.41
5/30/2012	19:48	6.1	10	55.1	0.9	-1	6.10	10.00	55.10	0.90	-1.00	-0.83	243,821	96.32	0.96	-1.41
5/30/2012	19:49	6.1	10	55.8	0.9	-1	6.10	10.00	55.80	0.90	-1.00	-0.83	243,821	97.54	0.96	-1.41
5/30/2012	19:50	6.2	9.9	55.3	1.1	-1	6.20	9.90	55.30	1.10	-1.00	-0.83	243,821	96.67	1.17	-1.41
5/30/2012	19:51	6.2	9.9	54	0.9	-1	6.20	9.90	54.00	0.90	-1.00	-0.83	243,821	94.39	0.96	-1.41
5/30/2012	19:52	6.4	9.8	53.2	1.2	-1	6.40	9.80	53.20	1.20	-1.00	-0.83	243,821	93.00	1.28	-1.41
5/30/2012	19:53	6.4	9.7	52.1	1.1	-1	6.40	9.70	52.10	1.10	-1.00	-0.83	243,821	91.07	1.17	-1.41
5/30/2012	19:54	6.3	9.7	51.1	0.8	-1	6.30	9.70	51.10	0.80	-1.00	-0.83	243,821	89.33	0.85	-1.41
5/30/2012	19:55	6.3	9.8	50.8	0.8	-1	6.30	9.80	50.80	0.80	-1.00	-0.83	243,821	88.80	0.85	-1.41
5/30/2012	19:56	6.2	9.8	50.2	0.9	-1	6.20	9.80	50.20	0.90	-1.00	-0.83	243,821	87.75	0.96	-1.41
5/30/2012	19:57	6.1	9.8	51.2	1	-1	6.10	9.80	51.20	1.00	-1.00	-0.83	243,821	89.50	1.06	-1.41
5/30/2012	19:58	6.2	9.9	51.8	1	-1	6.20	9.90	51.80	1.00	-1.00	-0.83	243,821	90.55	1.06	-1.41
5/30/2012	19:59	6.3	9.8	52.3	1.1	-1	6.30	9.80	52.30	1.10	-1.00	-0.83	243,821	91.42	1.17	-1.41
5/30/2012	20:00	6.2	9.8	53	1.1	-1	6.20	9.80	53.00	1.10	-1.00	-0.83	243,821	92.65	1.17	-1.41
5/30/2012	20:01	6.2	9.8	53.6	0.9	-1.1	6.20	9.80	53.60	0.90	-1.10	-0.92	243,821	93.70	0.96	-1.55
5/30/2012	20:02	6.1	9.8	53.4	0.9	-1	6.10	9.80	53.40	0.90	-1.00	-0.83	243,821	93.35	0.96	-1.41
5/30/2012	20:03	6.1	9.9	52.7	0.9	-1	6.10	9.90	52.70	0.90	-1.00	-0.83	243,821	92.12	0.96	-1.41
5/30/2012	20:04	6.1	9.9	53.4	0.9	-1	6.10	9.90	53.40	0.90	-1.00	-0.83	243,821	93.35	0.96	-1.41
5/30/2012	20:05	6.1	9.9	53.8	1	-1	6.10	9.90	53.80	1.00	-1.00	-0.83	243,821	94.05	1.06	-1.41
5/30/2012	20:06	6.1	9.9	54.4	0.8	-1	6.10	9.90	54.40	0.80	-1.00	-0.83	243,821	95.09	0.85	-1.41
5/30/2012	20:07	6.2	9.8	55	1	-1	6.20	9.80	55.00	1.00	-1.00	-0.83	243,821	96.14	1.06	-1.41
5/30/2012	20:08	6.1	9.8	55.1	0.9	-1	6.10	9.80	55.10	0.90	-1.00	-0.83	243,821	96.32	0.96	-1.41
5/30/2012	20:09	6.1	9.8	54.7	0.8	-1	6.10	9.80	54.70	0.80	-1.00	-0.83	243,821	95.62	0.85	-1.41

Sun Coke Granite City CEM's Compliance Data

Compliance Test Run # 3

		Raw Data					Calibration Corrected Data						Flow Data	Mass Rates		
Date	Hour	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	THC (dry ppm)	(dscfm)	NOX (lb/hr)	CO (lb/hr)	THC (lb/hr)
5/30/2012	20:10	6.1	9.8	54.6	0.9	-1	6.10	9.80	54.60	0.90	-1.00	-0.83	243,821	95.44	0.96	-1.41
5/30/2012	20:11	6	9.9	54.4	1.2	-1	6.00	9.90	54.40	1.20	-1.00	-0.83	243,821	95.09	1.28	-1.41
5/30/2012	20:12	6	9.9	54	1.6	-1	6.00	9.90	54.00	1.60	-1.00	-0.83	243,821	94.39	1.70	-1.41
5/30/2012	20:13	6.1	9.9	54	1.3	-1	6.10	9.90	54.00	1.30	-1.00	-0.83	243,821	94.39	1.38	-1.41
5/30/2012	20:14	6.1	9.9	54.1	1.2	-1	6.10	9.90	54.10	1.20	-1.00	-0.83	243,821	94.57	1.28	-1.41
5/30/2012	20:15	6.2	9.8	54.2	1	-1.1	6.20	9.80	54.20	1.00	-1.10	-0.92	243,821	94.74	1.06	-1.55
5/30/2012	20:16	6.2	9.8	55.5	0.9	-1	6.20	9.80	55.50	0.90	-1.00	-0.83	243,821	97.02	0.96	-1.41
5/30/2012	20:17	6.3	9.7	56.2	0.9	-1	6.30	9.70	56.20	0.90	-1.00	-0.83	243,821	98.24	0.96	-1.41
5/30/2012	20:18	6.3	9.7	56.4	0.8	-1	6.30	9.70	56.40	0.80	-1.00	-0.83	243,821	98.59	0.85	-1.41
5/30/2012	20:19	6.3	9.7	57.1	0.8	-1	6.30	9.70	57.10	0.80	-1.00	-0.83	243,821	99.81	0.85	-1.41
5/30/2012	20:20	6.4	9.7	56.4	0.8	-1	6.40	9.70	56.40	0.80	-1.00	-0.83	243,821	98.59	0.85	-1.41
5/30/2012	20:21	6.3	9.7	56.9	0.9	-1	6.30	9.70	56.90	0.90	-1.00	-0.83	243,821	99.46	0.96	-1.41
5/30/2012	20:22	6.4	9.7	56.5	0.8	-1	6.40	9.70	56.50	0.80	-1.00	-0.83	243,821	98.76	0.85	-1.41
5/30/2012	20:23	6.5	9.6	56.1	0.8	-1	6.50	9.60	56.10	0.80	-1.00	-0.83	243,821	98.07	0.85	-1.41
5/30/2012	20:24	6.4	9.6	56.5	0.7	-1	6.40	9.60	56.50	0.70	-1.00	-0.83	243,821	98.76	0.75	-1.41
5/30/2012	20:25	6.5	9.6	57.2	0.8	-0.9	6.50	9.60	57.20	0.80	-0.90	-0.75	243,821	99.99	0.85	-1.27
5/30/2012	20:26	6.4	9.6	56.8	0.8	-0.9	6.40	9.60	56.80	0.80	-0.90	-0.75	243,821	99.29	0.85	-1.27
5/30/2012	20:27	6.5	9.6	56.9	0.6	-1	6.50	9.60	56.90	0.60	-1.00	-0.83	243,821	99.46	0.64	-1.41
5/30/2012	20:28	6.6	9.6	56.3	0.7	-1	6.60	9.60	56.30	0.70	-1.00	-0.83	243,821	98.42	0.75	-1.41
5/30/2012	20:29	6.5	9.5	57.1	0.8	-1	6.50	9.50	57.10	0.80	-1.00	-0.83	243,821	99.81	0.85	-1.41
5/30/2012	20:30	6.6	9.5	57.9	0.9	-1	6.60	9.50	57.90	0.90	-1.00	-0.83	243,821	101.21	0.96	-1.41
5/30/2012	20:31	6.6	9.5	57.8	0.9	-1	6.60	9.50	57.80	0.90	-1.00	-0.83	243,821	101.04	0.96	-1.41
5/30/2012	20:32	6.6	9.5	56.9	0.9	-1	6.60	9.50	56.90	0.90	-1.00	-0.83	243,821	99.46	0.96	-1.41
5/30/2012	20:33	6.7	9.5	57.3	0.8	-1	6.70	9.50	57.30	0.80	-1.00	-0.83	243,821	100.16	0.85	-1.41
5/30/2012	20:34	6.7	9.5	58.1	0.8	-1	6.70	9.50	58.10	0.80	-1.00	-0.83	243,821	101.56	0.85	-1.41
5/30/2012	20:35	6.7	9.5	58	0.9	-1	6.70	9.50	58.00	0.90	-1.00	-0.83	243,821	101.39	0.96	-1.41
5/30/2012	20:36	6.7	9.4	57.6	0.7	-1	6.70	9.40	57.60	0.70	-1.00	-0.83	243,821	100.69	0.75	-1.41
5/30/2012	20:37	6.8	9.4	57.5	0.8	-1	6.80	9.40	57.50	0.80	-1.00	-0.83	243,821	100.51	0.85	-1.41
5/30/2012	20:38	6.7	9.4	58.7	0.8	-1	6.70	9.40	58.70	0.80	-1.00	-0.83	243,821	102.61	0.85	-1.41
5/30/2012	20:39	6.7	9.4	58.8	0.8	-1	6.70	9.40	58.80	0.80	-1.00	-0.83	243,821	102.79	0.85	-1.41
5/30/2012	20:40	6.8	9.4	58.4	0.9	-1	6.80	9.40	58.40	0.90	-1.00	-0.83	243,821	102.09	0.96	-1.41
5/30/2012	23:28	7.9	8.9	58.2	0.7	-1	7.90	8.90	58.20	0.70	-1.00	-0.83	243,821	101.74	0.75	-1.41
5/30/2012	23:29	7.9	8.9	59.5	0.7	-1	7.90	8.90	59.50	0.70	-1.00	-0.83	243,821	104.01	0.75	-1.41
5/30/2012	23:30	7.8	9	60.3	0.5	-1	7.80	9.00	60.30	0.50	-1.00	-0.83	243,821	105.41	0.53	-1.41

Sun Coke Granite City CEM's Compliance Data

Compliance Test Run # 3

		Raw Data					Calibration Corrected Data						Flow Data	Mass Rates		
Date	Hour	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	CO2 (%)	O2 (%)	NOX (ppm)	CO (ppm)	THC (ppm)	THC (dry ppm)	(dscfm)	NOX (lb/hr)	CO (lb/hr)	THC (lb/hr)
5/30/2012	23:31	7.7	9	59.8	0.6	-1	7.70	9.00	59.80	0.60	-1.00	-0.83	243,821	104.53	0.64	-1.41
5/30/2012	23:32	7.7	9	59.5	0.7	-1	7.70	9.00	59.50	0.70	-1.00	-0.83	243,821	104.01	0.75	-1.41
5/30/2012	23:33	7.6	9.1	59.8	0.7	-1	7.60	9.10	59.80	0.70	-1.00	-0.83	243,821	104.53	0.75	-1.41
5/30/2012	23:34	7.8	9.1	59.9	0.9	-1	7.80	9.10	59.90	0.90	-1.00	-0.83	243,821	104.71	0.96	-1.41
5/30/2012	23:35	7.9	9	58.7	0.9	-1	7.90	9.00	58.70	0.90	-1.00	-0.83	243,821	102.61	0.96	-1.41
5/30/2012	23:36	7.9	9	58	0.7	-1	7.90	9.00	58.00	0.70	-1.00	-0.83	243,821	101.39	0.75	-1.41
5/30/2012	23:37	7.9	8.9	57.5	0.7	-1	7.90	8.90	57.50	0.70	-1.00	-0.83	243,821	100.51	0.75	-1.41
5/30/2012	23:38	7.9	8.9	57.6	0.6	-1	7.90	8.90	57.60	0.60	-1.00	-0.83	243,821	100.69	0.64	-1.41
5/30/2012	23:39	7.9	8.9	56.8	0.8	-1	7.90	8.90	56.80	0.80	-1.00	-0.83	243,821	99.29	0.85	-1.41
5/30/2012	23:40	7.8	8.9	56.3	0.8	-1	7.80	8.90	56.30	0.80	-1.00	-0.83	243,821	98.42	0.85	-1.41
5/30/2012	23:41	7.7	9	55.5	0.8	-1	7.70	9.00	55.50	0.80	-1.00	-0.83	243,821	97.02	0.85	-1.41
5/30/2012	23:42	7.7	9	56	1	-1	7.70	9.00	56.00	1.00	-1.00	-0.83	243,821	97.89	1.06	-1.41
5/30/2012	23:43	7.6	9.1	57.3	1.2	-1	7.60	9.10	57.30	1.20	-1.00	-0.83	243,821	100.16	1.28	-1.41
5/30/2012	23:44	7.7	9.1	56.1	1	-1	7.70	9.10	56.10	1.00	-1.00	-0.83	243,821	98.07	1.06	-1.41
5/30/2012	23:45	7.8	9	54.7	1	-1	7.80	9.00	54.70	1.00	-1.00	-0.83	243,821	95.62	1.06	-1.41
5/30/2012	23:46	7.7	9	54.5	0.8	-1	7.70	9.00	54.50	0.80	-1.00	-0.83	243,821	95.27	0.85	-1.41
5/30/2012	23:47	7.6	9	54.8	0.8	-0.9	7.60	9.00	54.80	0.80	-0.90	-0.75	243,821	95.79	0.85	-1.27
5/30/2012	23:48	7.6	9.1	55.4	0.7	-1	7.60	9.10	55.40	0.70	-1.00	-0.83	243,821	96.84	0.75	-1.41
5/30/2012	23:49	7.6	9.1	55.7	0.8	-1	7.60	9.10	55.70	0.80	-1.00	-0.83	243,821	97.37	0.85	-1.41
5/30/2012	23:50	7.5	9.1	55.9	0.7	-1	7.50	9.10	55.90	0.70	-1.00	-0.83	243,821	97.72	0.75	-1.41
5/30/2012	23:51	7.5	9.1	56	1	-1	7.50	9.10	56.00	1.00	-1.00	-0.83	243,821	97.89	1.06	-1.41
5/30/2012	23:52	3.2	3.1	57.3	1.8	-0.5	3.20	3.10	57.30	1.80	-0.50	-0.42	243,821	100.16	1.92	-0.70
5/30/2012	23:53	0.4	0.2	28	2.8	-1.1	0.40	0.20	28.00	2.80	-1.10	-0.92	243,821	48.95	2.98	-1.55
5/30/2012	23:54	0.4	0.1	2.2	2.5	-1.1	0.40	0.10	2.20	2.50	-1.10	-0.92	243,821	3.85	2.66	-1.55
5/30/2012	23:55	5.8	5	0.8	2.3	-1	5.80	5.00	0.80	2.30	-1.00	-0.83	243,821	1.40	2.45	-1.41
5/30/2012	23:56	9.2	9	0.6	1.2	-1	9.20	9.00	0.60	1.20	-1.00	-0.83	243,821	1.05	1.28	-1.41
5/30/2012	23:57	9.9	9.8	0.4	0.3	-1	9.90	9.80	0.40	0.30	-1.00	-0.83	243,821	0.70	0.32	-1.41
Averages		**6.61**	**9.33**	**51.97**	**1.19**	**-0.99**	**6.61**	**9.33**	**51.97**	**1.19**	**-0.99**	**-0.82**	**243,821**	**90.85**	**1.27**	**-1.39**

Appendix D

Calibration Data

Pitot Tube Calibration Data Sheet Calculation Printout

Pitot Tube Identification Number: P5-003 **Date:** 1/16/2012

Calibrated by: T.Brado

"A" Side Calibration

Run No.	ΔP_{std}	ΔP_s	$C_{p(s)}$	Absolute Deviation
1	1.50	2.20	0.817	0.0006
2	1.50	2.19	0.819	0.0025
3	1.50	2.22	0.814	0.0031

Average $C_{p(s)}$ (Side A): **0.817** | **0.0021**

"B" Side Calibration

Run No.	ΔP_{std}	ΔP_s	$C_{p(s)}$	Absolute Deviation
1	1.55	2.25	0.822	0.0014
2	1.50	2.12	0.833	0.0096
3	1.45	2.14	0.815	0.0082

Average $C_{p(s)}$ (Side B): **0.823** | **0.0064**

Average $C_{p(s)}$ Difference: **0.0063**

Average $C_{p(s)}$ $(C_{p(s)}(A)+C_{p(s)}(B))/2$: **0.820**

Acceptance Criteria

Average Deviation (Side A) : Must be ≤ 0.01 — **PASS**

Average Deviation (Side B) : Must be ≤ 0.01 — **PASS**

Average $C_{p(s)}$ Difference : Must be ≤ 0.01 — **PASS**

Calibrator: _____ Date: 1/16/12

Supervisor: _____ Date: 1/17/12

Pitot Tube Calibration Data Sheet Calculation Printout

Pitot Tube Identification Number: PT-16 **Date:** 1/16/2012

Calibrated by: T.Brado

"A" Side Calibration

Run No.	ΔP_{std}	ΔP_s	$C_{p(s)}$	Absolute Deviation
1	1.50	2.10	0.837	0.0068
2	1.50	2.05	0.847	0.0034
3	1.50	2.05	0.847	0.0034

Average $C_{p(s)}$ (Side A): **0.843** | **0.0045**

"B" Side Calibration

Run No.	ΔP_{std}	ΔP_s	$C_{p(s)}$	Absolute Deviation
1	1.50	2.15	0.827	0.0141
2	1.50	2.02	0.853	0.0121
3	1.45	2.00	0.843	0.0020

Average $C_{p(s)}$ (Side B): **0.841** | **0.0094**

Average $C_{p(s)}$ Difference: **0.0025**

Average $C_{p(s)}$ ($C_{p(s)}$(A)+$C_{p(s)}$(B))/2: **0.842**

Acceptance Criteria

Average Deviation (Side A) : Must be ≤ 0.01 — **PASS**

Average Deviation (Side B) : Must be ≤ 0.01 — **PASS**

Average $C_{p(s)}$ Difference : Must be ≤ 0.01 — **PASS**

Calibrator: _____ Date: 1/16/12

Supervisor: _____ Date: 1/17/12

Pitot Tube Calibration Data Sheet Calculation Printout

Pitot Tube Identification Number: PT-6 **Date:** 1/16/2012

Calibrated by: T.Brado

"A" Side Calibration

Run No.	ΔP_{std}	ΔP_s	$C_{p(s)}$	Absolute Deviation
1	1.45	2.00	0.843	0.0014
2	1.45	2.02	0.839	0.0028
3	1.45	2.00	0.843	0.0014

Average $C_{p(s)}$ (Side A): **0.842** | **0.0019**

"B" Side Calibration

Run No.	ΔP_{std}	ΔP_s	$C_{p(s)}$	Absolute Deviation
1	1.47	2.04	0.840	0.0030
2	1.50	2.08	0.841	0.0026
3	1.50	2.04	0.849	0.0056

Average $C_{p(s)}$ (Side B): **0.843** | **0.0037**

Average $C_{p(s)}$ Difference: **0.0018**

Average $C_{p(s)}$ $(C_{p(s)}(A)+C_{p(s)}(B))/2$: **0.842**

Acceptance Criteria

Average Deviation (Side A) : Must be ≤ 0.01 — **PASS**

Average Deviation (Side B) : Must be ≤ 0.01 — **PASS**

Average $C_{p(s)}$ Difference : Must be ≤ 0.01 — **PASS**

Calibrator: [signature] Date: 1/16/12

Supervisor: [signature] Date: 1/17/12

URS

DRY GAS METER CALIBRATION SPREADSHEET

CONTROL BOX ID:	URS 002	CALIBRATED BY:	R. Raymond
CALIBRATION STANDARD:	Secondary	AMBIENT TEMPERATURE (F):	70
CALIBRATION STANDARD ID:	328963	AMBIENT PRESSURE (In Hg):	28.91
DATE CALIBRATED:	5/14/2012	Secondary Standard Correction Factor	1.018

GAS VOLUME

Setting (delta H)	Gas Volume Metered (ft3) Secondary Standard	Gas Volume Corrected (ft3) Vw	Gas Volume DGM (ft3) Control Console Vd
0.5	5	5.090	5.127
1.0	5	5.090	5.144
2.0	10	10.180	10.386
3.0	10	10.180	10.440
4.0	10	10.180	10.464

TEMPERATURE

Calibrator Temperature (F) Tw	Average DGM (F) Td
69.0	76.0
69.0	77.0
70.0	79.0
70.0	81.0
70.0	83.0

CALCULATIONS

(min)	Gamma (Y)	Delta H@
13.14	1.0046	1.9076
9.10	1.0019	1.8264
13.01	0.9918	1.8667
10.33	0.9878	1.7587
9.1	0.9867	1.8131
	Avg Y	**Avg Delta H@**
	0.9946	**1.8345**
	0.9746	1.6345
Tolerances	1.0146	2.0345

Y = Ratio of reading of wet test meter to dry test meter; tolerance for individual values +/- 0.02 from average.

Delta H @ = Orfice pressure differential that equates to 0.75 cfm of air @ 68 degrees F and 29.92 inches of mercury, in.H2O: tolerance for individual values +/- 0.20 from average.

Is Unit Within Calibration Tolerances? **YES**

Calibrator: Robert Raymond Date: 5/14/2012

Approved by: Michael Mond Date: 5/18/12

URS

DRY GAS METER CALIBRATION SPREADSHEET

CONTROL BOX ID:	URS 002	CALIBRATED BY:	R. Raymond
CALIBRATION STANDARD:	Secondary	AMBIENT TEMPERATURE (F):	68
CALIBRATION STANDARD ID:	328963	AMBIENT PRESSURE (In Hg):	28.92
DATE CALIBRATED:	6/12/2012	Secondary Standard Correction Factor	1.018

GAS VOLUME

Setting (delta H)	Gas Volume Metered (ft3) Secondary Standard	Gas Volume Corrected (ft3) Vw	Gas Volume DGM (ft3) Control Console Vd
0.5	5	5.090	5.147
1.0	5	5.090	5.153
2.0	10	10.180	10.386
3.0	10	10.180	10.453
4.0	10	10.180	10.488

TEMPERATURE

Calibrator Temperature (F) Tw	Average DGM (F) Td
69.0	80.0
71.0	78.0
71.0	81.0
71.0	82.0
72.0	84.0

CALCULATIONS

(min)	Gamma (Y)	Delta H@
13.10	1.0082	1.8813
9.06	0.9983	1.8201
12.47	0.9936	1.7144
10.26	0.9865	1.7377
9.05	0.9825	1.8028
	Avg Y	**Avg Delta H@**
	0.9938	**1.7913**
	0.9738	1.5913
Tolerances	1.0138	1.9913

Y = Ratio of reading of wet test meter to dry test meter; tolerance for individual values +/- 0.02 from average.

Delta H @ = Orfice pressure differential that equates to 0.75 cfm of air @ 68 degrees F and 29.92 inches of mercury, in.H2O: tolerance for individual values +/- 0.20 from average.

Is Unit Within Calibration Tolerances? **YES**

Calibrator: Robert Raymond Date: 6/12/2012

Approved by: Date: 6/12/2012

THERMOCOUPLE READOUT CALIBRATION DATA FORM
(FOR K-TYPE THERMOCOUPLES)

Control Box / Thermocouple Readout Number:	urs002		Calibrated By:	R.Raymond
Ambient Temperature:	70	°F	Date:	12/27/2011
Omega Engineering Calibrator	Model No. 22 TC		Serial #'s	174470

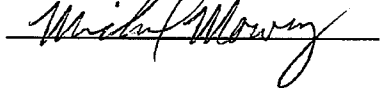
Primary Standards Directly Traceable t National Institute of Standards and Technology (NIST)

Reference[a] Source Temperature, (°F)	Test Thermometer Temperature, (°F)	Temperature Difference, %
0	1	0.22
200	202	0.30
400	398	0.23
600	601	0.09
1000	1002	0.14
1200	1200	0.00

Are all the Thermocouple Readout calibration points within calibration standard of <= to 1.5 %? **Yes**

$$\frac{(\text{Ref. Temp., oF} + 460) - (\text{Test Therm. Temp., oF} + 460)}{\text{Ref. Temp., oF} + 460} * 100 <= 1.5\ \%$$

Calibrator Signature: Robert Raymond Date: 12/27/2011

Approval Signature:  Date: 1/3/12

URS

DRY GAS METER CALIBRATION SPREADSHEET

CONTROL BOX ID:	urs 005	CALIBRATED BY:	R. Raymond
CALIBRATION STANDARD:	Secondary	AMBIENT TEMPERATURE (F):	68
CALIBRATION STANDARD ID:	328963	AMBIENT PRESSURE (In Hg):	29
DATE CALIBRATED:	5/18/2012	Secondary Standard Correction Factor	1.018

GAS VOLUME

Setting (delta H)	Gas Volume Metered (ft3) Secondary Standard	Gas Volume Corrected (ft3) Vw	Gas Volume DGM (ft3) Control Console Vd
0.5	5	5.090	5.272
1.0	5	5.090	5.285
2.0	10	10.180	10.606
3.0	10	10.180	10.649
4.0	10	10.180	10.673

TEMPERATURE

Calibrator Temperature (F) Tw	Average DGM (F) Td
70.0	72.0
71.0	74.0
72.0	77.0
73.0	80.0
73.0	82.0

CALCULATIONS

(min)	Gamma (Y)	Delta H@
13.22	0.9679	1.9467
9.17	0.9661	1.8733
12.47	0.9640	1.7289
10.31	0.9612	1.7696
9.04	0.9602	1.8072
	Avg Y	**Avg Delta H@**
	0.9639	**1.8252**
	0.9439	1.6252
Tolerances	0.9839	2.0252

Y = Ratio of reading of wet test meter to dry test meter; tolerance for individual values +/- 0.02 from average.

Delta H @ = Orfice pressure differential that equates to 0.75 cfm of air @ 68 degrees F and 29.92 inches of mercury, in.H2O; tolerance for individual values +/- 0.20 from average.

Is Unit Within Calibration Tolerances? YES

Calibrator: Robert Raymond Date: 5/18/2012

Approved by: William C. Thomas Date: 6/12/12

URS

DRY GAS METER CALIBRATION SPREADSHEET

CONTROL BOX ID:	urs 005	CALIBRATED BY:	R. Raymond
CALIBRATION STANDARD:	Secondary	AMBIENT TEMPERATURE (F):	71
CALIBRATION STANDARD ID:	328963	AMBIENT PRESSURE (In Hg):	28.94
DATE CALIBRATED:	6/29/2012	Secondary Standard Correction Factor	1.018

GAS VOLUME

Setting (delta H)	Gas Volume Metered (ft3) Secondary Standard	Gas Volume Corrected (ft3) Vw	Gas Volume DGM (ft3) Control Console Vd
0.5	5	5.090	5.389
1.0	5	5.090	5.402
2.0	10	10.180	10.795
3.0	10	10.180	10.801
4.0	10	10.180	10.806

TEMPERATURE

Calibrator Temperature (F) Tw	Average DGM (F) Td
70.0	75.0
71.0	76.0
71.0	78.0
71.0	80.0
72.0	83.0

CALCULATIONS

(min)	Gamma (Y)	Delta H@
13.14	0.9522	1.9164
9.18	0.9487	1.8743
12.59	0.9506	1.7561
10.30	0.9512	1.7565
9.06	0.9519	1.8089
	Avg Y	**Avg Delta H@**
	0.9509	**1.8224**
	0.9309	1.6224
Tolerances	0.9709	2.0224

Y = Ratio of reading of wet test meter to dry test meter; tolerance for individual values +/- 0.02 from average.

Delta H @ = Orifice pressure differential that equates to 0.75 cfm of air @ 68 degrees F and 29.92 inches of mercury, in.H2O: tolerance for individual values +/- 0.20 from average.

Is Unit Within Calibration Tolerances? **YES**

Calibrator: Robert Raymond Date: 6/29/2012

Approved by: William G. Thomas Date: 7/2/12

THERMOCOUPLE READOUT CALIBRATION DATA FORM
(FOR K-TYPE THERMOCOUPLES)

Control Box / Thermocouple Readout Number:	urs 005		Calibrated By:	R.Raymond
Ambient Temperature:	70	°F	Date:	12/28/2011
Omega Engineering Calibrator	Model No.	22 TC	Serial #'s	174470

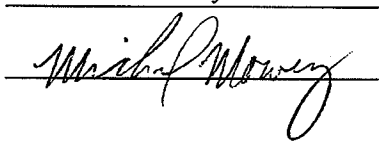
Primary Standards Directly Traceable t National Institute of Standards and Technology (NIST)

Reference[a] Source Temperature, (°F)	Test Thermometer Temperature, (°F)	Temperature Difference, %
0	1	0.22
200	202	0.30
400	398	0.23
600	604	0.38
1000	1009	0.62
1200	1209	0.54

Are all the Thermocouple Readout calibration points within calibration standard of <= to 1.5 %? **Yes**

$$\frac{(\text{Ref. Temp., oF} + 460) - (\text{Test Therm. Temp., oF} + 460)}{\text{Ref. Temp., oF} + 460} * 100 <= 1.5\ \%$$

Calibrator Signature: Robert Raymond Date: 12/28/2011

Approval Signature:  Date: 1/3/12

URS

Stack Temperature Sensor Calibration Spreadsheet
Primary Standard: NIST Traceable Thermometer
Enclosures Denote Input Data

Thermocouple ID:	6-003	Calibrated By:	R. Raymond
Calibration Standard:	PRIMARY	Thermocouple Readout Number	SR 2 /0201004
Calibration Standard ID:	15059408	Thermocouple Readout Correlation:	1.00000
Date Calibrated:	1/18/2012	Ambient Temperature (F):	67

Reference Point Number	Source (Specify) See Note 1	Reference Thermometer Temperature F	Reference Thermometer Temperature C
1	Ice Bath	38.0	3.3
2	Ambient	61.0	16.1
3	Hot Sand	416.0	213.3

Thermocouple Potentiometer Temperature F	Corrected Potentiometer Temperature F	Corrected Potentiometer Temperature C	Temperature % Difference See Note 2
40.0	40.0	4.4	0.4
63.0	63.0	17.2	0.4
418.0	418.0	214.4	0.2

Does thermocouple Meet Specifications?

YES at 40 F
YES at 63 F
YES at 418 F

Calibrator Signature: Robert Raymond

Note 1 - Type of calibration system used
Note 2 - $\frac{[(\text{ref temp, C} + 273) - (\text{test thermometer temp, C} + 273)]}{\text{ref temp, C} + 273} 100 < 1.5\%$

URS

Stack Temperature Sensor Calibration Spreadsheet
Primary Standard: NIST Traceable Thermometer
Enclosures Denote Input Data

Thermocouple ID:	6-004	Calibrated By:	R. Raymond
Calibration Standard:	PRIMARY	Thermocouple Readout Number	SR-2 /0201004
Calibration Standard ID:	15059408	Thermocouple Readout Correlation:	1.00000
Date Calibrated:	1/18/2012	Ambient Temperature (F):	67

Reference Point Number	Source (Specify) See Note 1	Reference Thermometer Temperature F	Reference Thermometer Temperature C
1	Ice Bath	38.0	3.3
2	Ambient	61.0	16.1
3	Hot Sand	429.0	220.6

Thermocouple Potentiometer Temperature F	Corrected Potentiometer Temperature F	Corrected Potentiometer Temperature C	Temperature % Difference See Note 2
40.0	40.0	4.4	0.4
64.0	64.0	17.8	0.6
439.0	439.0	226.1	1.1

Does thermocouple Meet Specifications?

YES at 40 F
YES at 64 F
YES at 439 F

Calibrator Signature: Robert Raymond

Note 1 - Type of calibration system used

Note 2 - $\frac{[(\text{ref temp, C} + 273) - (\text{test thermometer temp, C} + 273)]100}{\text{ref temp, C} + 273} < 1.5\%$

URS

Stack Temperature Sensor Calibration Spreadsheet
Primary Standard: NIST Traceable Thermometer
Enclosures Denote Input Data

Thermocouple ID:	*Gooseneck 50*	Calibrated By:	R. Raymond
Calibration Standard:	PRIMARY	Thermocouple Readout Number	SR-2 /0201004
Calibration Standard ID:	15059408	Thermocouple Readout Correlation:	1.00000
Date Calibrated:	1/18/2012	Ambient Temperature (F):	67

Reference Point Number	Source (Specify) See Note 1	Reference Thermometer Temperature F	Reference Thermometer Temperature C
1	Ice Bath	40.0	4.4
2	Ambient	65.0	18.3
3	Hot Water	113.0	45.0

Thermocouple Potentiometer Temperature F	Corrected Potentiometer Temperature F	Corrected Potentiometer Temperature C	Temperature % Difference See Note 2
43.0	43.0	6.1	0.6
70.0	70.0	21.1	1.0
114.0	114.0	45.6	0.2

Does thermocouple Meet Specifications?

YES at 43 F
YES at 70 F
YES at 114 F

Calibrator Signature: Robert Raymond

Note 1 - Type of calibration system used
Note 2 - $\frac{[(\text{ref temp, C} + 273) - (\text{test thermometer temp, C} + 273)]100}{\text{ref temp, C} + 273} < 1.5\%$

URS

Stack Temperature Sensor Calibration Spreadsheet
Primary Standard: NIST Traceable Thermometer
Enclosures Denote Input Data

Thermocouple ID:	*Gooseneck 901*	Calibrated By:	R. Raymond
Calibration Standard:	PRIMARY	Thermocouple Readout Number	SR 2/0201004
Calibration Standard ID:	15059408	Thermocouple Readout Correlation:	1.00000
Date Calibrated:	1/18/2012	Ambient Temperature (F):	67

Reference Point Number	Source (Specify) See Note 1	Reference Thermometer Temperature F	Reference Thermometer Temperature C
1	Ice Bath	40.0	4.4
2	Ambient	65.0	18.3
3	Hot Water	114.0	45.6

Thermocouple Potentiometer Temperature F	Corrected Potentiometer Temperature F	Corrected Potentiometer Temperature C	Temperature % Difference See Note 2
44.0	44.0	6.7	0.8
69.0	69.0	20.6	0.8
115.0	115.0	46.1	0.2

Does thermocouple Meet Specifications?

YES at 44 F
YES at 69 F
YES at 115 F

Calibrator Signature: Robert Raymond

Note 1 - Type of calibration system used
Note 2 - $\frac{[(\text{ref temp, C} + 273) - (\text{test thermometer temp, C} + 273)]100}{\text{ref temp, C} + 273} < 1.5\%$

Calibration Gas Certificates

Airgas

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Airgas Specialty Gases
12722 South Wentworth Avenue
Chicago, IL 60628
(773) 785-3000 Fax: (773) 785-1928
www.airgas.com

Part Number:	E02NI99E15A3615	Reference Number:	54-124293129-3
Cylinder Number:	CC3911	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12011	Valve Outlet:	660
		Analysis Date:	Dec 19, 2011

Expiration Date: Dec 19, 2013

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
NITRIC OXIDE	100.0 PPM	98.95 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			
Total oxides of nitrogen		99.00 PPM		For Reference Only

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	09060909	CC268510	95.66PPM NITRIC OXIDE/	Jan 15, 2015

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nexus 470 AEP0000428	FTIR	Dec 14, 2011

Triad Data Available Upon Request

Notes:

Approved for Release

Airgas

Airgas Specialty Gases
12722 S. Wentworth Avenue
Chicago, IL 60628
1-773-785-3000
FAX 1-773-785-1928
http://www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E03NI58E15A02X7	Reference Number:	54-124226841-4
Cylinder Number:	CC94024	Cylinder Volume:	161 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2014 PSIG
Analysis Date:	Jul 20, 2010	Valve Outlet:	590

Expiration Date: Jul 20, 2013

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
CARBON DIOXIDE	21.00 %	20.69 %	G2	+/- 1% NIST Traceable
OXYGEN	21.00 %	20.96 %	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/O2	60608	CC207980	22.51% OXYGEN/NITROGEN	May 01, 2016
NTRM	1	CC214614	6.986% CARBON DIOXIDE/NITROGEN	May 01, 2011

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
(CO2-1)HORIBA VIA-510	NDIR	Jul 03, 2010
(O2-1)HORIBA MPA-510	Paramagnetic	Jul 03, 2010

Triad Data Available Upon Request

Notes:

Approved for Release

Airgas

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Airgas Speciality Gases
12722 S. Wentworth Avenue
Chicago IL 60628
(773) 785-3000
http://www.airgas.com

Part Number:	E03NI80E15A0138	Reference Number:	54-124237991-6
Cylinder Number:	CC286931	Cylinder Volume:	151 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
Analysis Date:	Oct 19, 2010	Valve Outlet:	590

Expiration Date: Oct 19, 2013

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
CARBON DIOXIDE	10.00 %	9.917 %	G1	+/- 1% NIST Traceable
OXYGEN	10.00 %	10.03 %	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/O2	06120103	CC195929	9.898% OXYGEN/	Oct 02, 2012
NTRM/CO2	98120809	CC59142	13.78% CARBON DIOXIDE/	Oct 02, 2012

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
(CO2-1)HORIBA VIA-510	NDIR	Oct 03, 2010
(O2-1)HORIBA MPA-510	Paramagnetic	Oct 03, 2010

Triad Data Available Upon Request

Notes:

Approved for Release

Airgas

Airgas Specialty Gases
12722 S. Wentworth Avenue
Chicago, IL 60628
(773) 785-3000 Ext. 13 Fax: (773) 785-1928
http://www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02NI99E15A0163	Reference Number:	54-124265280-5
Cylinder Number:	SG9151860BAL	Cylinder Volume:	125 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	1750 PSIG
Analysis Date:	May 06, 2011	Valve Outlet:	660

Expiration Date: May 06, 2013

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
NITRIC OXIDE	45.00 PPM	44.91 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			
Total oxides of nitrogen		45.19 PPM		For Reference Only

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/NO	09060802	CC267505	94.26PPM NITRIC OXIDE/NITROGEN	Jan 20, 2015

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nexus 470 AEP0000428	FTIR	Apr 21, 2011

Triad Data Available Upon Request

Notes:

Approved for Release

Airgas

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Airgas Speciality Gases
12722 S. Wentworth Avenue
Chicago, IL 60628
1-773-785-3000
FAX: 1-773-785-1928
www.airgas.com

Part Number:	E02NI99E15A0406	Reference Number:	54-124189286-7
Cylinder Number:	SG9197301BAL	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
Analysis Date:	Sep 04, 2009	Valve Outlet:	350

Expiration Date: Sep 04, 2012

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
CARBON MONOXIDE	90.00 PPM	89.52 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/CO	09060521	CC280705	98.88PPM CARBON MONOXIDE/	Feb 11, 2013

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet Nexus	FTIR	Aug 21, 2009

Triad Data Available Upon Request

Notes:

QA Approval

Airgas

Airgas Specialty Gases
12722 S. Wentworth Avenue
Chicago IL 60628
1-773-785-3000
FAX 1-773-785-1928
http://www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02NI99E15A0302	Reference Number:	54-124212307-2
Cylinder Number:	XC027692B	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
Analysis Date:	Mar 30, 2010	Valve Outlet:	350

Expiration Date: Mar 30, 2013

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
CARBON MONOXIDE	50.00 PPM	50.27 PPM	G1	+/-1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/CO	51203	CC180115	49.33PPM CARBON MONOXIDE/NITROGEN	Feb 02, 2013

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet Nexus	FTIR	Mar 01, 2010

Triad Data Available Upon Request

Notes:

Approved for Release

Airgas

Airgas Specialty Gases
12722 S. Wentworth Avenue
Chicago, IL 60628
1-773-785-3000
FAX: 1-773-785-1928
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02NI99E15A0556	Reference Number:	54-124187188-6
Cylinder Number:	CC170826	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
Analysis Date:	Aug 07, 2009	Valve Outlet:	350

Expiration Date: Aug 07, 2012

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which effect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
PROPANE	25.00 PPM	25.03 PPM	G1	+/-1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/C3H8	520	SG902252ALB	50.6PPM PROPANE/NITROGEN	Apr 01, 2010

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet Nexus	FTIR	Jul 29, 2009

Triad Data Available Upon Request

Notes:

Curt Stewart

QA Approval

Airgas

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Airgas Specialty Gases
12722 S. Wentworth Avenue
Chicago, IL 60628
1-773-785-3000
FAX: 1-773-785-1928
www.airgas.com

Part Number:	E02NI99E15A0931	Reference Number:	54-124189286-13
Cylinder Number:	XC005711B	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
Analysis Date:	Aug 28, 2009	Valve Outlet:	350

Expiration Date: Aug 28, 2012

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
PROPANE	50.00 PPM	50.43 PPM	G1	+/-1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/C3H8	520	SG9169384BAL	50.5PPM PROPANE/	Apr 01, 2010

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet Nexus	FTIR	Aug 21, 2009

Triad Data Available Upon Request

Notes:

QA Approval

Airgas

Airgas Specialty Gases
12722 S. Wentworth Avenue
Chicago, IL 60628
1-773-785-3000
FAX: 1-773-785-1928
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02NI99E15A0564	Reference Number:	54-124220143-3
Cylinder Number:	CC178781	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
Analysis Date:	Jun 01, 2010	Valve Outlet:	350

Expiration Date: Jun 01, 2013

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
PROPANE	90.00 PPM	89.90 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/C3H8	90617	CC310580	97.82PPM PROPANE/AIR	Oct 02, 2013

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
(FTIR-1)Nicolet Nexus	FTIR	May 14, 2010

Triad Data Available Upon Request

Notes:

Approved for Release

Airgas

Airgas Specialty Gases
12722 S. Wentworth Avenue
Chicago, IL 60628
1-773-785-3000
FAX 1-773-785-1926
http://www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02AI99E15A1704	Reference Number:	54-124231273-1
Cylinder Number:	CC26684	Cylinder Volume:	83 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	1150 PSIG
Analysis Date:	Aug 23, 2010	Valve Outlet:	660

Expiration Date: Aug 23, 2012

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
NITROGEN DIOXIDE	50.00 PPM	49.91 PPM	G1	+/- 1% NIST Traceable
Air	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
GMIS/NO2	08	CC55707	61.14PPM NITROGEN DIOXIDE/NITROGEN	Apr 04, 2012

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
(CH-2)CAI-600HCLD	Chemiluminescence	Aug 03, 2010

Triad Data Available Upon Request

Notes:

Approved for Release

Appendix E

Test Protocol

Intent to Test Notification
Gateway Energy
Coke Company

Prepared for:

Gateway Energy
2585 Edwardsville Road
Granite City, IL 62040

Prepared by:

URS Corporation
Oak Ridge, TN

April 23, 2012

URS

URS Project No.
39400684.00001

INTENT TO TEST NOTIFICATION
GATEWAY ENERGY
COKE COMPANY

Prepared for:

Gateway Energy
Granite City Facility
Sun Coke, Inc.
2585 Edwardsville Road
Granite City, IL 62040

Prepared by:

URS Corporation
1093 Commerce Park Drive, Suite 100
Oak Ridge, Tennessee 37830

April 23, 2012

URS Project No.:

39400684.00001

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ACRONYMS

CO	Carbon Monoxide
CO_2	Carbon Dioxide
CEM	Continuous Emission Monitor
DSCF	Dry Standard Cubic Feet
EPA	Environmental Protection Agency
GECC	Gateway Energy Coke Company
HRSG	Heat Recovery Steam Generator
IEPA	Illinois Environmental Protection Agency
MACT	Maximum Achievable Control Technology
NO_x	Nitrogen Oxides
O_2	Oxygen
PM	Particulate Matter
PPMV	Parts Per Million by Volume
SO_2	Sulfur Dioxide
URS	URS Corporation
VOM	Volatile Organic Matter

1.0 INTRODUCTION

The Gateway Energy Coke Company Facility (GECC) utilizes Sun Coke's Thompson heat recovery type of oven to manufacture metallurgical coke. Plant operations began in 2009. As part of the construction permit conditions (119040ATN July 11, 2006) the plant is required to perform compliance stack testing within 18 – 24 months after completing the initial performance stack tests in order to prove continuing compliance.

The $PM_{10/2.5}$ that will be performed during this compliance test is the third and final round of $PM_{10/2.5}$ sampling required by the construction permit.

The intent of this notification is to provide a description of the compliance testing activities that will be performed on the Main Waste Gas Stack (Main Stack).

1.1 Process Description

In coke production, from both heat recovery and byproduct ovens, the volatile fraction of the coal is driven off in a reducing atmosphere. Coke is essentially the remaining carbon and ash. With byproduct ovens, the volatiles and combustion products are collected downstream of the oven chamber and refined in a chemical plant to produce coke oven gas and other products such as tar, ammonia, and light oils. In heat recovery ovens, all the coal volatiles are oxidized.

Heat recovery steam generators (HRSGs) recover heat from the oven waste gases. The cooled gases pass through a lime spray dryer/baghouse system prior to being exhausted from the main stack. The oven pushing/charging machine travels on rails between ovens during the production cycle. A traveling hood/baghouse system controls emissions from coal charging that escape the ovens. On the opposite side of the ovens from the pushing/charging machine, coke is pushed into a flat push hot car that travels on rails from the oven to the quench tower. A multicyclone captures and controls emissions from pushing the coke into the car and during travel to the quench tower. A baghouse controls particulate emissions from the coke screening and crushing facilities in the coke processing area.

There are currently 120 ovens at GECC that operate on a 48-hour coking cycle. The operating schedule is arranged such that that half the ovens are charged each day. For example, the 30 even-numbered ovens are charged one day and the 30 odd-numbered ovens are charged the next. The 60 ovens that are charged daily are currently performed over two shifts.

1.2 Source Description

The Main Stack is constructed of carbon steel and is coated on the inside to protect the metal from corrosion. Figure 1-1 is schematic of the Main Stack and provides a layout of the sampling traverse points that will be used to collect the stack samples.

24 Sample Points Required
4 ports with 6 points each

Traverse Layout

Point	Distance (from wall)
1	3.28
2	10.45
3	18.41
4	27.61
5	39.00
6	55.54

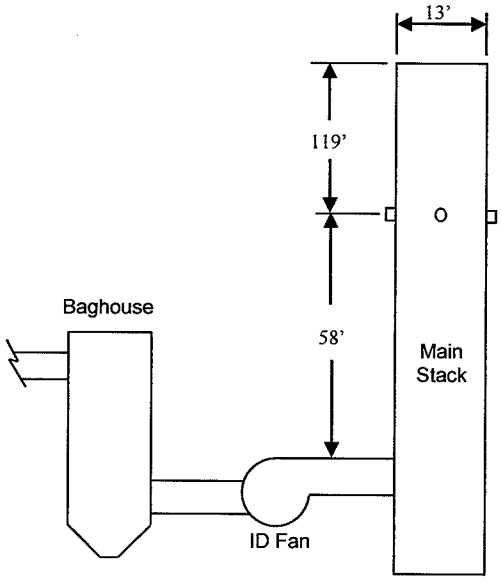

Figure 1-1 Schematic of Main Stack

Due to the diameter of the stack, testing will be performed using four sample ports located 90° apart on the same elevation plane. The sampling platform that accesses the test ports is approximately 65 feet above grade.

2.0 TESTING

Because the production cycles are staggered across all the battery of ovens, the gases sent to the main baghouse are typically uniform and could be sampled at any given time, with the exception of when pushing and charging production is in process. In order to obtain a reasonable average of the main stack emissions, two test runs will be performed during non-production times and one test run will be performed during a production cycle.

The test requirements for the Main Stack are summarized in Table 2-1, followed by a detailed description of each type of sampling that will be performed.

Pollutant	**Test Method**	**Comment**
Filterable Particulate	EPA Method 5	
$PM_{10/2.5}$ and Condensable Particulates	EPA Method 201A/202	
Lead	EPA Method 12	Combined with Method 5.
NO_x	EPA Method 7E	
CO	EPA Method 10	
VOM	EPA Method 25A	Measured as propane.
Stack traverse point layout	EPA Method 1	
Gas flowrate	EPA Method 2	
Gas molecular weight	EPA Method 3	
Moisture	EPA Method 4	Combined with Method 5

2.1 Filterable Particulate Sampling

Samples for filterable particulate matter (PM) will be withdrawn isokinetically from the stack using an EPA Test Method 5 sampling train.

Figure 2-1 is a schematic of the EPA Method 5 sampling train.

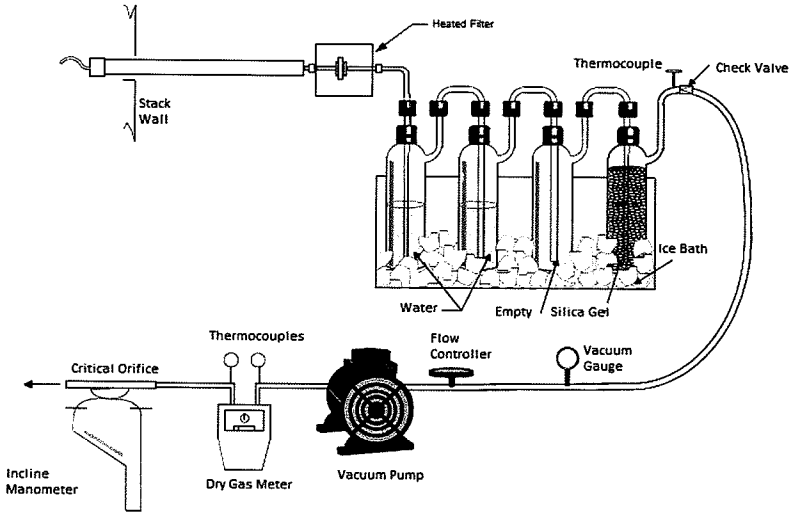

Figure 2-1 Schematic of EPA Method 5 Sampling Train

The standard Method 5 sampling train consisted of a glass-lined, heat-traced, probe with a stainless steel button hook nozzle, and attached thermocouple and pitot tube. The probe and filter heater box will be maintained at a temperature of 250° F ±25°. The filter box will contain a glass filter holder containing a pre-weighed glass fiber filter. The filter is followed by a series of four impingers. The first Greenburg-Smith impinger will contain 100 ml of distilled water. The second impinger, which is a modified Greenburg-Smith, will also contain 100 ml of distilled water. The third impinger is a modified Greenburg-Smith and will initially be empty. The fourth impinger, which is a modified Greenburg-Smith, will be filled with approximately 200 grams of indicating silica gel. The impingers will be weighed prior to assembling the sampling train to permit gravimetric moisture determination. The impinger train will be connected to a control console by means of a flexible umbilical cord. The control console contains a sample pump, dry gas meter, and calibrated orifice meter, along with various switches and heat controllers.

The PM sampling will be performed by placing the sample probe nozzle at the first traverse point within the stack and starting the test run. The stack gas flow (Δp) will be measured with the S-type pitot tube along with temperature of the gas stream. This data will be used to determine the appropriate isokinetic sampling rate (ΔH). Additional test data will also be

collected for the sample point. This process will be repeated at each of the 24 sample traverse points. The minimum amount of sample volume required to be collected is 30 dry standard cubic feet (dscf) over a one-hour period.

At the conclusion of the PM test run the sample train probe will be removed from the stack and final leak check performed. After the leak check, the sample train will be recovered using the procedures described below:

- Nozzle and Probe – The nozzle and probe will be rinsed and brushed three times using reagent grade acetone. The rinsate will be collected into a sample container.

- Filter Holder – The filter will be removed from the filter holder and placed into a Petri dish. The Petri dish will be sealed with Teflon tape to prevent loss or contamination of the sample. The front half of the filter holder will then be rinsed and brushed three times with reagent grade acetone. The rinsate will then be added to the nozzle/probe wash sample collection container.

- Impingers – Each impinger will be removed from the sample train and weighed to determine moisture gain. The contents of the first three impingers will be discarded, and the silica gel in the fourth impinger will be recovered for regeneration.

A sample of the acetone used in the sample train recovery will be collected for a reagent blank. The reagent blank will be analyzed in the same manner as the field samples.

The filter and probe washes will be analyzed by URS as described below.

- Filter – The filter will be analyzed by opening the petri dish containing the filter and placing the Petri dish into a desiccator and dried for a minimum of 24 hours. The filter will then weighed twice or until a constant weight is achieved.

- Probe Wash – The probe wash, and acetone reagent blank, will be emptied into a pre-weighed sample dish. The sample will then be allowed to dry at ambient temperature

and pressure inside a laboratory hood. Once dried, the sample dish will be placed into a desiccator and dried for a minimum of 24 hours. The sample dish will then be weighed twice or until a constant weight is achieved.

The weight gain of the acetone blank will be subtracted from the probe wash weight gain. The corrected probe wash weight gain will be added to the weight gain of the filter. This combined weight gain will be used to calculate the PM concentration and mass emission rate.

2.2 Lead Sampling

To perform the lead sampling, URS will employ the same EPA Method 5 sampling train previously described but with two alterations. The first alteration will be to replace the distilled water in impingers one and two with 0.1N nitric acid to allow lead sampling to be performed in the sample train. The second alteration will be to perform a second probe wash using 0.1N nitric acid after the initial acetone probe wash is completed. Combining these two test methods is allowed under EPA Method 12 sampling requirements.

The recovery of the PM/lead sample train will follow the exact same procedures as described for the PM test, except that the liquid collected in the first three impingers will be collected into a sample container for subsequent analysis for lead. After the probe wash and filter have been analyzed for PM, both the acetone and 0.1N nitric acid probe washes from the test run will be reconstituted with 0.1N nitric acid, and combined into a single sample. The filter, probe wash and impinger samples will then be delivered to the Test America laboratory in Knoxville, TN for subsequent lead analysis according to EPA Method 12 procedures.

2.3 Gaseous Sampling

A single continuous emission monitor (CEM) sampling system will be utilized to perform gaseous sampling on the main stack for nitrogen oxides (NO_x), carbon monoxide (CO) and volatile organic matter (VOM). The concentration of oxygen (O_2) and carbon dioxide (CO_2) will also be measured by CEM to determine the molecular weight of the stack gas.

The CEM sampling system will consist of a heated stainless steel probe that will be used to extract the gas sample from the main stack. An umbilical containing a heated Teflon sample line will transport the sample from the point of extraction to the non-contact gas conditioning chiller system. The chiller will be used to condense moisture from the gas stream, while the pollutant passes through to the gaseous analyzers. Just prior to the inlet of the gas conditioner, a separate insulated sample line will be used to extract a smaller sample of stack gas for the volatile organic matter (VOM) CEM. The VOM CEM requires the sample gas to remain above the moisture dew point for proper analysis.

Each analyzer will be located in a temperature-controlled sampling trailer to minimize thermal effects on the calibration of the instruments. Each reference method CEM will be connected to an Environmental Systems Corporation datalogger for collection of data. One-minute averages of each reference method CEM will be recorded throughout the compliance test period.

The concentration and mass emission rate of NO_x, CO and VOM in the gas stream will be measured and reported in parts per million by volume (ppmv) on a dry basis, and in pounds per hour, respectively. The emission rate will be calculated using the specific run-time average concentration in ppmv, the dry standard volumetric flow rate and the Ideal Gas Law.

The NO_x concentration be measured using a TECO chemiluminescent NO-NO_x gas analyzer. The NO_x sampling conformed to procedures presented in EPA 40 CFR 60, Appendix A, Method 7E. Prior to performing the compliance test, the NO_x CEM will be challenged with a known concentration of NO_2 protocol calibration gas to verify the capability of the analyzer to convert NO_2 to NO.

The CO concentrations will be measured using an API Model 300E gas filter correlation analyzer. The CO sampling conformed to procedures presented in 40 CFR 60, Appendix A, Method 10.

The VOM concentrations will be measured using a JUM Flame Ionizing Detector gas analyzer. The VOM sampling conformed to procedures presented in EPA 40 CFR 60, Appendix A, Method 25A. The JUM will be calibrated with protocol propane gases, and the measured concentrations will be reported as propane and the carbon equivalent.

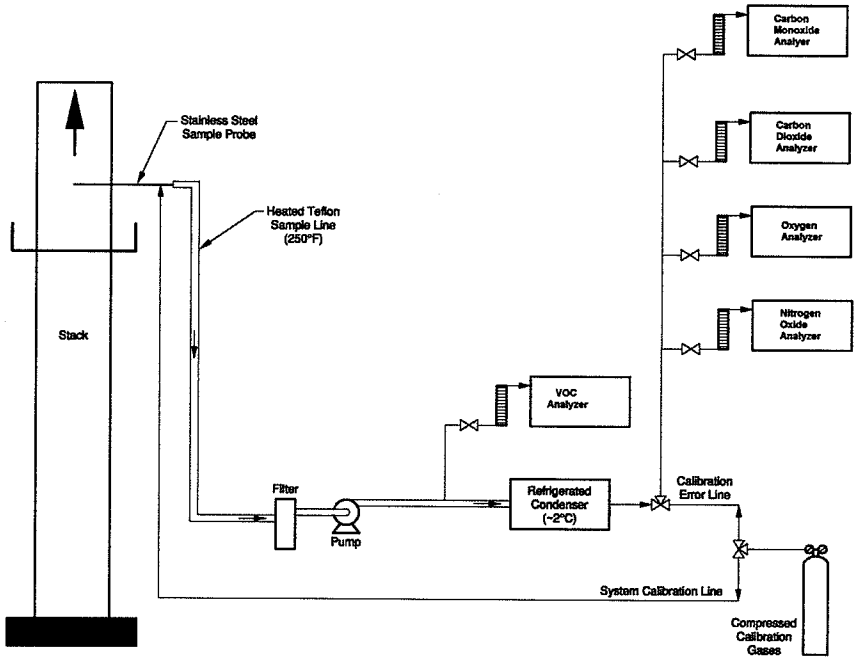

Figure 2-3. Schematic of CEM Sampling System

Prior to performing the compliance test, the CEMs will be calibrated with a zero nitrogen gas along with a mid-level and high-level Relative Accuracy Test Audit (RATA) class calibration gases. An O_2 stratification check will be performed on the stack prior to performing the compliance test runs.

3.0 TEST SCHEDULE

Table 3-1 illustrates the schedule for the compliance tests. In order to perform one of the three compliance test runs during a push/charge production cycle, testing will need be performed over a two day period.

Table 3-1. Compliance Test Schedule

Event	Day 1 (5/29/12)	Day 2 (5/30/12)	Day 3 (5/31/12)	Day 4 (6/1/12)
Travel to site	•			
Attend site safety training	•			
Set up on Main Stack		•		
Main Stack – Run 1 (Production Run)		•		
Main Stack – Run 2			•	
Main Stack – Run 3			•	
Demobilize test equipment			•	
Return travel to URS Oak Ridge office				•

Based on the two compliance testing schedules referenced in the plant operating permit, Items 4.1.7-2 iii and iv, the window in which this testing can be performed is between May 25th and July 14th. The compliance testing will be performed during the week of May 27, 2012.

4.0 REPORT SCHEDULE

At the completion of the test project, a final engineering report will be submitted to Illinois EPA. The standard turnaround time for the lead analysis is 21 days after receipt of the samples to the lab. Due to the fact that the PM/lead 0.1N nitric probe wash samples will require additional time to evaporate, the lead samples will not be delivered to Test America no sooner than 1 week after URS starts the PM analysis. Based on this scenario, the analytical report for the lead samples will not be available for at least 30 days after completion of testing. Once the lead analytical report is received by URS, a final draft test report will be submitted to GECC for review.

The final review and subsequent editing and binding of the reports will take approximately one week to complete. The final compliance report will then be submitted to IEPA within 45 days after completion of all field sampling.

The report will include:

- A summary of results;
- Narrative description of the testing;
- Description of test method(s), including description of sample points, sampling trains, analysis equipment, and test schedule;
- Detailed description of test conditions, including:
  - Process information listed in the test plan and
  - Control equipment information listed in the test plan; and
- Data and calculations, including copies of all raw data sheets, opacity observation records, records of laboratory analyses, sample calculations, and URS equipment calibration data.

Appendix A

Examples of URS Field Data Sheets

and

Calculations

URS **STACK TEST DATA SHEET** Method used: _____

Project: _____ Barom. Psr.: _____ Stack Dia.: _____

Project No: _____ Static Psr.: _____ Stack Area: _____

Source: _____ Meter Box I.D.: _____ Port Length: _____

Run No.: _____ Delta H @: _____ Port Dia.: _____

Date: _____ Gamma: _____ Probe Liner: _____

Operator: _____ Pitot Coef.: _____ Filter No.: _____

TRAVERSE POINT NUMBER	SAMPLING TIME Clock	Sample	VELOCITY DELTA P	SAMPLE DELTA H	GAS SAMPLE VOLUME	DGM TEMP.	STACK TEMP.	PROBE TEMP.	FILTER BOX TEMP.	LAST IMPINGER TEMP.	TRAIN VACUUM
AVERAGE											

LEAK CHECKS	
Pitot impact:	
Pitot static:	
Train initial:	
Train Final:	

NOZZLE MEASUREMENT	
I.D. No.:	
1	
2	
3	
Avg.	

STACK GAS ANALYSIS			
	CO2	O2	
1			
2			
3			
Avg.			

NOTES: _____

URS

PARTICULATE TEST LAB DATA SHEET

PROJECT: _____ JOB NO.: _____
SOURCE: _____ DATE: _____
TRAIN I.D.: _____ TEST NO.: _____
COLLECTED BY: _____ CHKD. BY: _____

CONDENSATION

IMPINGER NO.	INITIAL VOL., ml/g	FINAL VOL., ml/g	NET GAIN, ml/g
1			
2			
3			
4			
5			
6			
7			
TOTAL			

PARTICULATE

SAMPLE I.D. NO.	INITIAL WT., g	FINAL WT., g	NET WT., g
PROBE WASH			
REAGENT BLANK			
CORRECTED PROBE WASH*			
#1 FILTER			
#2 FILTER			
IMPINGERS			

*subtract reagent blank from probe wash

TOTAL PARTICULATED COLLECTED

PARTICULATE COLLECTED (excluding impinger catch)

PARTICULATE COLLECTED (including impinger catch)

URS

IMPINGER LAB SHEET

Test Method: _____

PROJECT: _____ JOB NO.: _____

SOURCE: _____ DATE: _____

TRAIN I.D.: _____ TEST NO.: _____

COLLECTED BY: _____

IMPINGER NO.	INITIAL VOL., ml/g	FINAL VOL., ml/g	NET GAIN, ml/g
1			
2			
3			
4			
TOTAL			

CALIBRATION WEIGHT

CALIBRATED VALUE, g	MEASURED VALUE, g	DIFFERENCE, g

NOTES: _____

_____

URS

CEM RESPONSE TIME TEST

Date of Test:

Analyzer Type:

S/N:

Span Gas Concentration:

Analyzer Span Setting:

UPSCALE RESPONSE			
	Start	**95% Response**	**Time**
1			
2			
3			
Average Upscale Response			

DOWNSCALE RESPONSE			
	Start	**95% Response**	**Time**
1			
2			
3			
Average Downscale Response			

UPSCALE RESPONSE = Time required to reach 95% of stable reading shifting from stable zero to stack gas.

DOWNSCALE RESPONSE = Time required to reach 95% of stable reading shifting from stable high-level cal to stack gas or stable gas to zero.

RESPONSE TIME = The longer of the two mean times.

URS

CEM CALIBRATION DATA

Sampling Location		Plant Name	
Date		Plant Rep.	
Run Number		Team Leader	
Start Time		CEM Operator	
Stop Time		Project Number	

	Analyzer Number	Analyzer Span
O2		25
CO2		25
CO		1000
THC		
NOx		1000
SO2		100

	Calibration Gas Specification	CALIBRATION ERROR CHECK				SYSTEM CAL CHECK					
		Calibration Value	Cylinder Number (1)	Analyzer Calibration Response	Difference	Pre Run		Post Run			Calibration Correction Factors
	(% of Span)	(% or ppm)			(% of Span)	System Response	Syst. Bias (% of Span)	System Response	Syst. Bias (% of Span)	Drift (% of Span)	
O2 Zero	< 20										
O2 Mid	40-60										
O2 High	20-100										
CO2 Zero	< 20										
CO2 Mid	40-60										
CO2 High	20-100										
CO Zero	< 20										
CO Mid	40-60										
CO High	20-100										
THC Zero	0										
THC Low	25-35										
THC Mid	45-55										
THC High	80-90										
NOx Zero	< 20										
NOx Mid	40-60										
NOx High	20-100										
SO2 Zero	< 20										
SO2 Mid	40-60										
SO2 High	20-100										

(1) Not applicable if using calibration gas dilution system.

(2) Method 20 specifications (% oxygen concentrations) are 0, NR, 11-14, and 20.9.

(3) Not specified by Method 10, use 80-100% of span value.

(4) Method 20 specifications are 0, 20-30, 45-55, and 80-90.

NR = Not Required by EPA Method.

THC Calibration Error is to be conducted through the sampling system per M25A.

THC Calibration Errors are calculated with respect to cylinder concentration, not analyzer span.

NO-NO_x Converter Efficiency Checkout

Date: _____
Project: _____
Analyzer: _____
Model: _____
S/N: _____

Location: _____
Technician: _____
Converter Type: _____
Operating Range: _____

				NO	NO_x	Total NO_x
						$NO + O_2$
		SPAN	A (90% * SPAN)	B (20% * SPAN)	C	D
Cylinder Number	Cal Gas Concentration	Span Value	Analyzer Response	O_3 Generator Output as "NO"	NO_x Mode Output	O_3 Generator Output Off

EFFICIENCY = (1 + (C-D)/(A-B)) x 100

Converter Efficiency = **#DIV/0!** (Must be greater than 90% conversion)

Procedures

1. Zero Analyzer
2. Connect outlet of the NO_x Generator to the sample inlet of the analyzer with correct operating range.
3. Span gas = 80% NO of range selected, analyzer in NO mode, introduce span gas to NO_x generator inlet and adjust flow on the NO_x generator, record response (SPAN).
4. Start NO_x generator Air Supply, adjust flow so that NO indicated = 90% SPAN, record "A".
5. Power the NO_x generator, adjust Variac so that response is 20% of SPAN and record "B".
6. Switch analyzer to NO_x mode and record "C".
7. Turn AC power off to NO_x generator, maintain gas flow, this is total NO_x "D".
8. Calculate efficiency.

Example Calculations - Method 5 Test

Dry Molecular Weight

$$Md = (0.44 \times \%CO_2) + (0.32 \times \%O_2) + (0.28 \times \%N_2)$$

Wet Molecular Weight

$$Ms = Md \times (1\text{-}Bws) + (18.0 \times Bws)$$

Meter Volume at Standard Conditions

$$Vm(std) = 17.647 \times Y \times Vm \times (Pbar + \Delta H/13.6)$$

Volume of Water Vapor Condensed

$$Vwstd = 0.0471 \times (\text{net } H_2O \text{ gain})$$

Moisture Content (%)

$$Bws = Vwstd / (Vwstd + Vmstd)$$

Average Duct Velocity (Ft/Minute)

$$Vs = 174 \times Cp \times \text{Sqrt } \Delta P \text{ (avg)} \times Ts (°R) / (Ps \times Ms))^{\wedge}.5$$

Volumetric Flow Rate (ACFM)

$$Qa = Vs \times A$$

Volumetric Flow Rate (ACFM @ STP)

$$Qs = 17.647 \times Qa \times (Ps / Ts(°R))$$

Volumetric Flow Rate (DSCFM)

$$Qstd(dry) = Qstd \times (1 - Bws)$$

Isokinetic Variation:

$$\%ISO = (0.0945 \times Ts \times Vm(std)) / (Vs \times \theta \times An \times Ps \times (1 - Bws)$$

PM Concentration:

This example represents the filterable fraction. For other fractions, use the obtained m_n for that particulate fraction.

$$Co = (Mn \times 15.43) / Vmstd$$

PM Emission Rate:

$$ER = Co \times Qstd \times 60$$